

F. GLASS.  
CARRYING CRANKS OVER DEAD POINTS.

No. 41,373.

Patented Jan. 26, 1864.

Fig 1

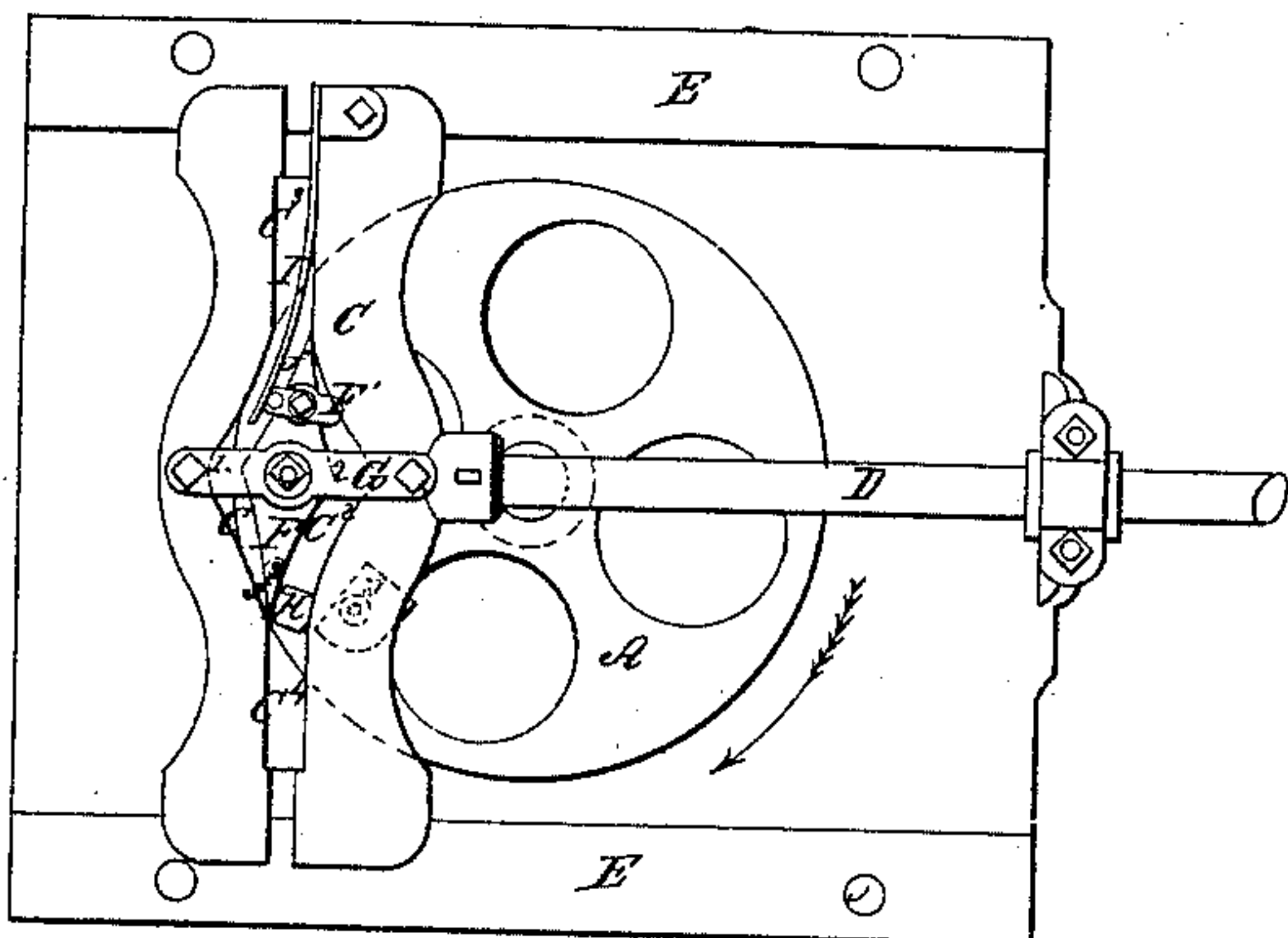


Fig 3

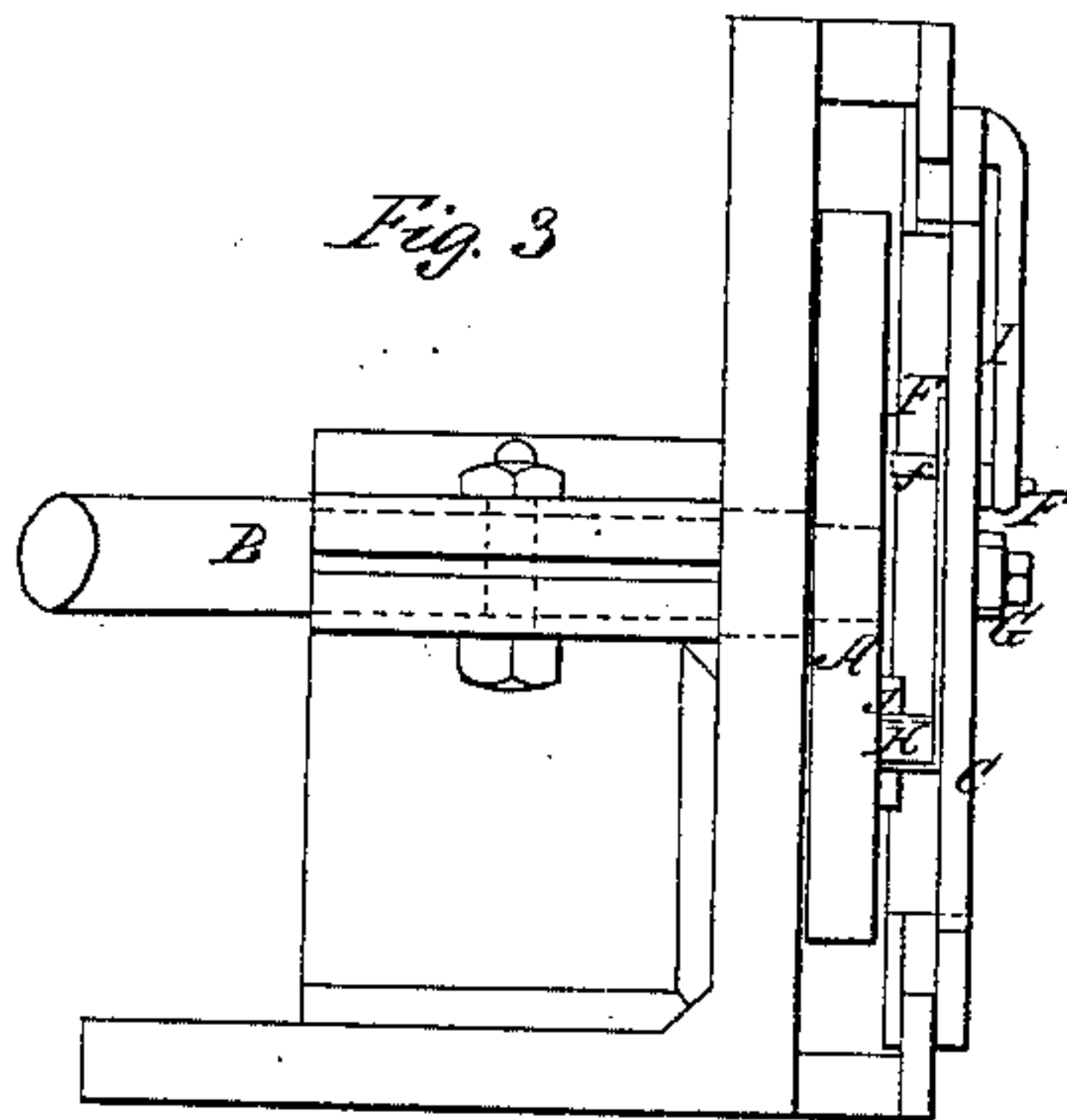


Fig 2

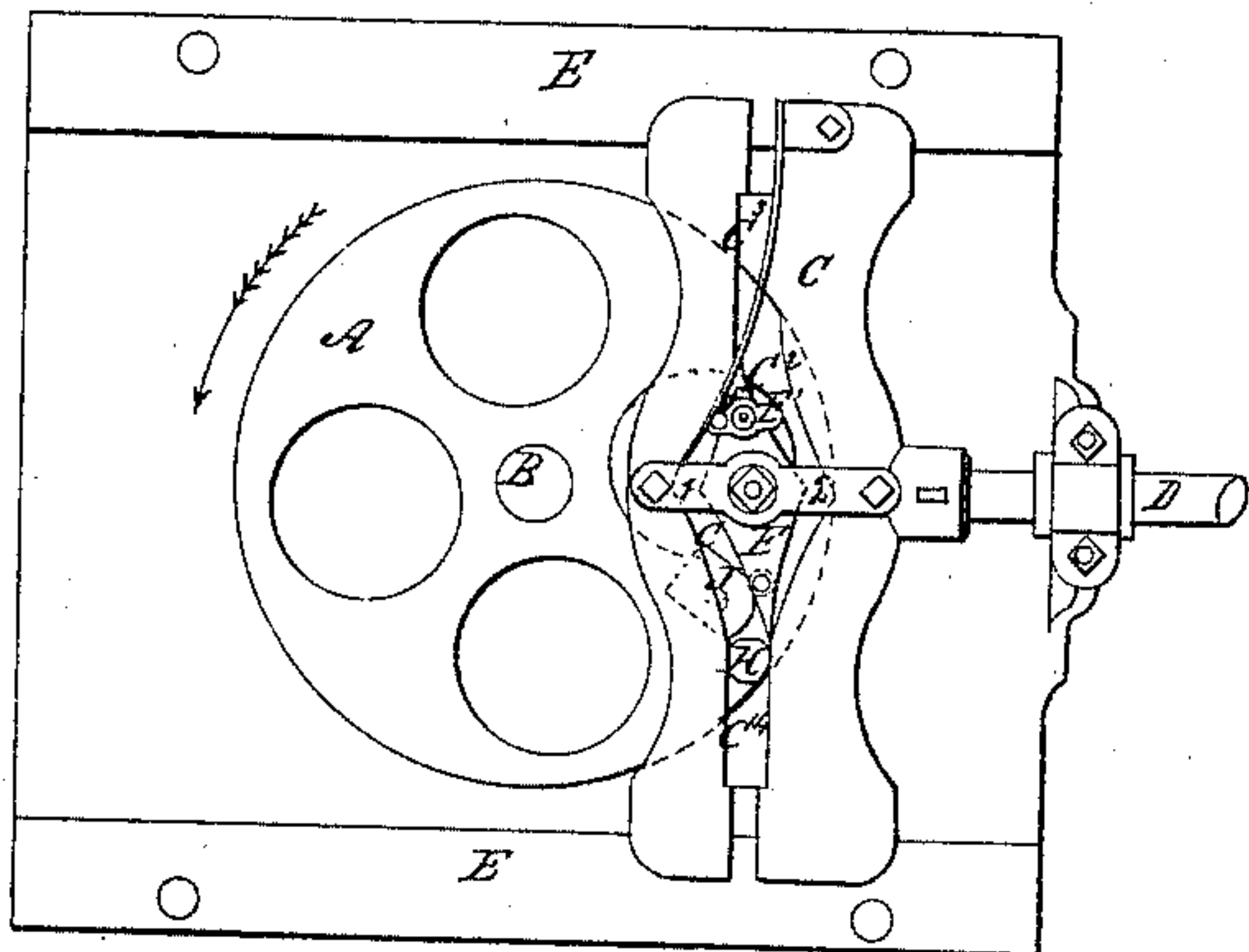
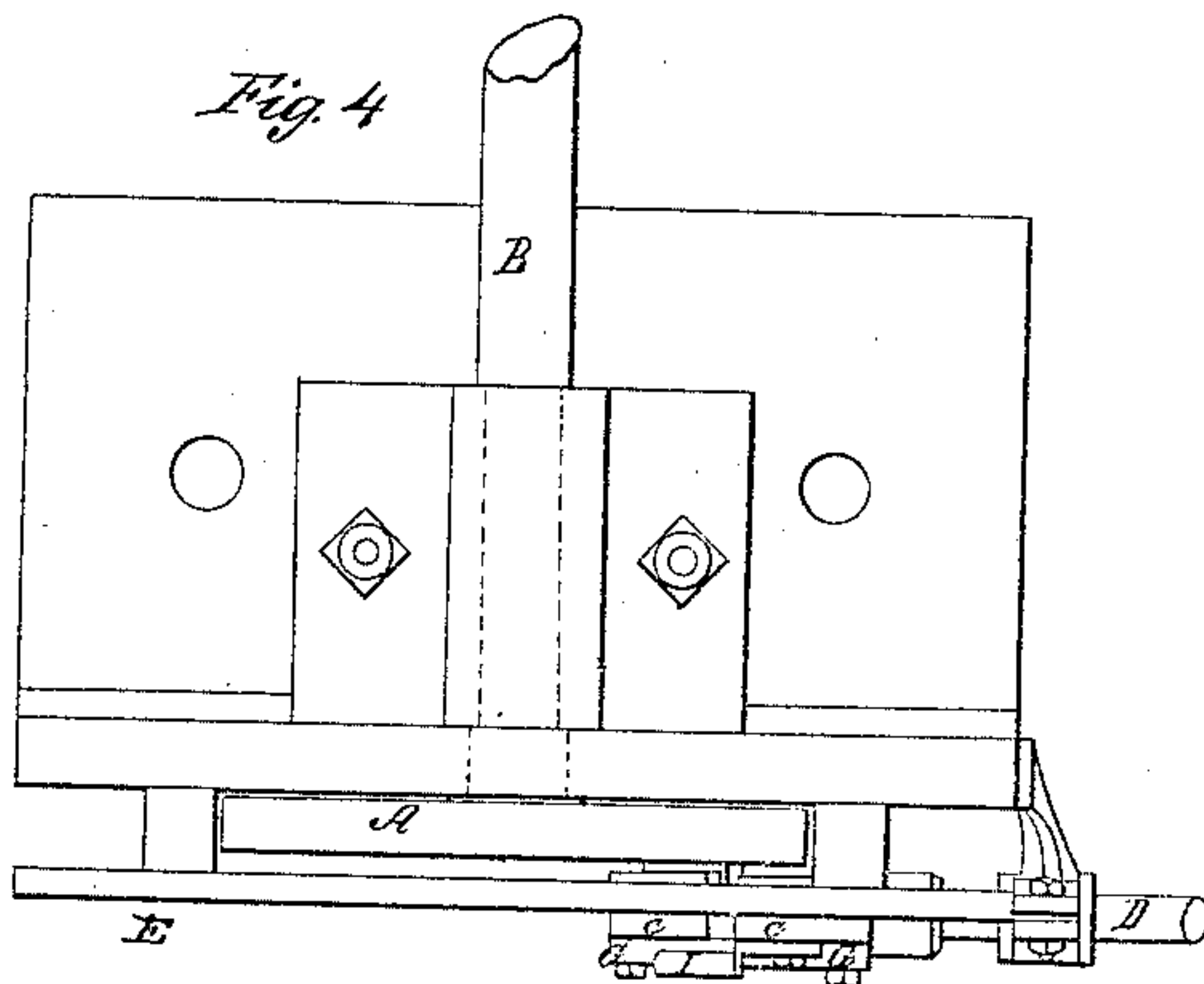


Fig 4



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# UNITED STATES PATENT OFFICE.

FRANCIS GLASS, OF KNIGHTSTOWN, INDIANA.

## IMPROVEMENT IN CARRYING CRANKS OVER DEAD-POINTS.

Specification forming part of Letters Patent No. 41,373, dated January 26, 1864.

*To all whom it may concern:*

Be it known that I, FRANCIS GLASS, of Knightstown, in the county of Henry and State of Indiana, have invented a certain new and Improved Device for Carrying Cranks Over the Dead-Points; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a side elevation of my invention. Fig. 2 is a similar view showing the parts in a different position. Fig. 3 is an end elevation showing its application to a driving-shaft; and Fig. 4 is a plan of the same.

Similar letters of reference indicate corresponding parts in the several views.

The object of this invention is to produce a device whereby a crank may be carried over its dead-points and novel means provided for reversing the motion, and also allowing the engine to be stopped or started freely at any point, the device hereinafter described being a modification of the invention described in my former application filed in the United States Patent Office on the 11th of November, 1862.

In order that others skilled in the art to which my invention appertains may be enabled to fully understand and use the same, I will proceed to describe its construction and operation.

In the accompanying drawings, A may represent a crank-wheel which is keyed upon and designed to rotate the driving-shaft B.

C represents a cross-head, which is reciprocated in the usual manner by the piston-rod D, and which traverses ways E E.

F represents a diamond-shaped angular block or gate pivoted to the cross-piece G, and located within a corresponding space, C' C<sup>2</sup>, in the cross-head C.

C<sup>3</sup> C<sup>4</sup> represent slots which communicate with the space C' C<sup>2</sup>, and which, in conjunction with the latter, permit the requisite movement of a wrist-pin, H, projecting from the cross-head C. In the drawings this pin H is represented as being of octagonal form, but it may be constructed in any other polygonal form competent to render it capable of performing the function to be hereinafter explained.

I represents an elastic bar or spring, which

may be attached in any suitable manner at one end of the cross-head C, and projects inward for the purpose of holding the pivoted gate F in proper position to allow the passage of the wrist-pin H while the apparatus is in operation, said spring I resting against a shoulder or projection, F', formed on or attached to the gate F. In each end of the gate F is attached a pin, *f* or *f'*, which pins project toward the crank-wheel A, and are moved by a cam, J. This cam J operates, in connection with the pins *f* *f'*, to regulate the position of the gate F when the motion of the apparatus is reversed.

Operation: Fig. 1 represents the cross-head C in an advanced position and the crank-wrist H at a point near the lower end of the gate F, and within the space C<sup>2</sup>. By advancing the piston to the full extremity of its stroke the inclined inner surface of the cross-head C will exert a pressure upon the crank-wrist H and carry the latter to the angle 2 of the gate F, indicated in dotted outline. This pin is so constructed and applied in such manner that when it reaches this angle of the gate F, or that on the opposite side thereof, (indicated by the Fig. 1,) the angle or corner of the same which is in closest proximity with the gate will be beyond the angle of the latter relatively to the direction in which the crank is being turned, and the pin H will present to the angle of the gate F an oblique surface which is inclined in such manner that when the piston D is retracted the pressure of the gate upon the pin will readily carry the latter beyond the angle of the former, when, by the inclined surface of said gate, the pin will be moved in an upward direction and guided into the upper slot, C<sup>3</sup>, in the cross-head C, which slot it is caused to ascend until it reaches a point on a vertical line with the axis of the crank-wheel A. When the pin H has reached this latter point, the part of the crank-wheel to which it is attached begins of course to descend. The spring I yields to allow the pin H to pass the upper end or point of the gate F, and then presses said end to its original position, so that the pin in descending is guided into the space C', down which it is carried till it reaches the angle 1. The remarks made in reference to the pin passing the angle 2 of the gate may be applied here. The piston-rod, having been retracted to the



full extent of its movement to bring the pin H to and slightly beyond the angle 1 of the block, is advanced in order to move the pin in a downward direction, the spring I yielding to permit the pin to pass the lower end of the gate F and into the slot C<sup>4</sup>, and then restoring said gate to its original position, as before. The pin H, having traversed the slot C<sup>4</sup>, is again moved to the angle 2, and the operation continues in the manner described. It will be seen that the rapid reciprocation of the piston-rod D causes a correspondingly rapid and an unintermitting rotation of the crank-wheel A; also, that the various positions which the pin H assumes consequent upon the revolution of the crank are compensated for by the movement of the cross-head C on the ways E, and thus the cross-head acts with equal efficiency upon the wheel irrespective of the position of the pin H. The motion of the crank-wheel A may be reversed by reversing the piston either when at half-stroke or in any other position it may occupy, excepting when advanced or retracted to its fullest extent. The parts being in the position shown in Fig. 2, the motion of the crank-wheel can be reversed by retracting the piston, the parts having been carried to the position shown by the advanced motion of the piston. The reversed motion of the piston carries the pin H to the angle 1 of the gate F. When the pin H has by the advancement of the piston been caused to traverse the slot C<sup>3</sup> and returned to a

point in close proximity with the upper end of the gate F the cam J, acting upon the pin f', throws the said end into proper position to cause the crank-pin H to descend in the space C<sup>2</sup>, and when the crank-pin has traversed the slot C<sup>4</sup> and returned to a point near the lower end of the gate F this end is thrown into proper position by the cam J acting upon the pin f. If desired, the position of the spring I may be changed so as to act upon the end of the gate F in the opposite direction from that shown in Fig. 1 in order to adapt the pin H to pass the angles 1 2 more freely when the apparatus is working reversely. This changing the position of the spring in order to more effectually adapt the gate F to a reversed motion of the crank may be effected by direct connection with the reversing-gear of the engine, so as to require no special or independent adjustment.

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

The combination, with the piston-rod D and cross-head C, of the angular block or gate F, controlled by a spring or cam and employed to carry the wrist-pin H beyond the dead-points, in the manner explained.

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Witnesses:

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