

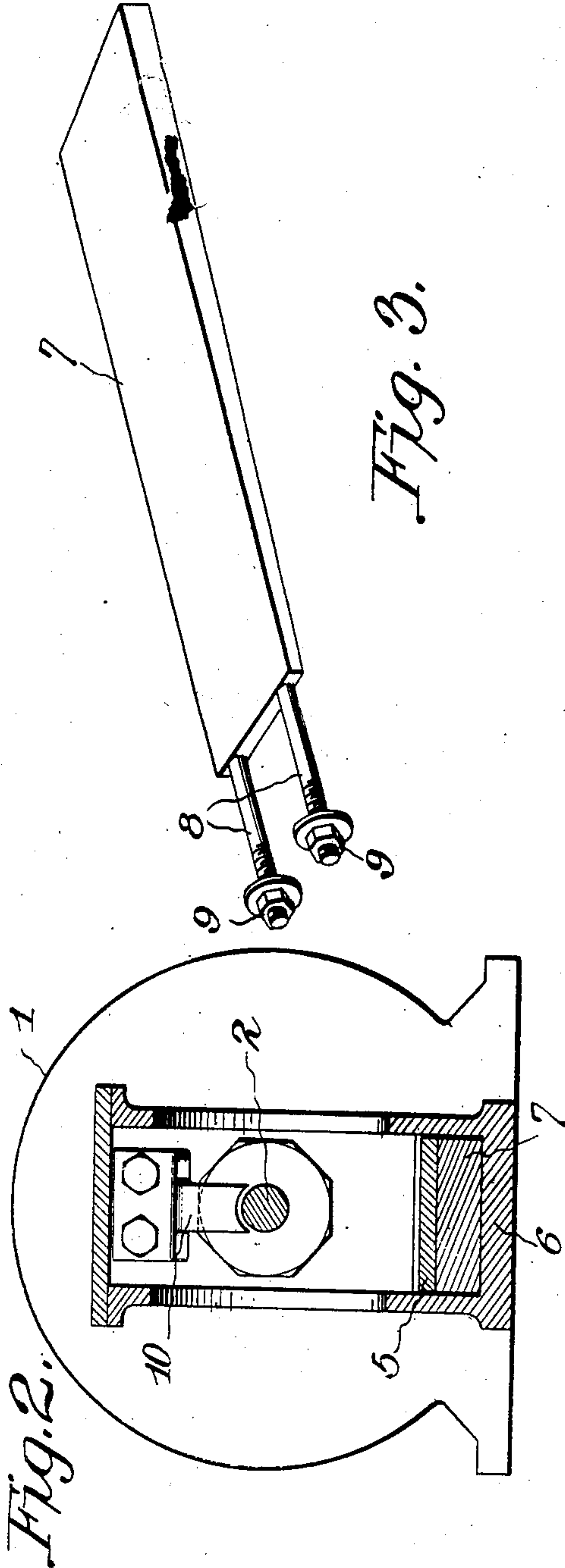
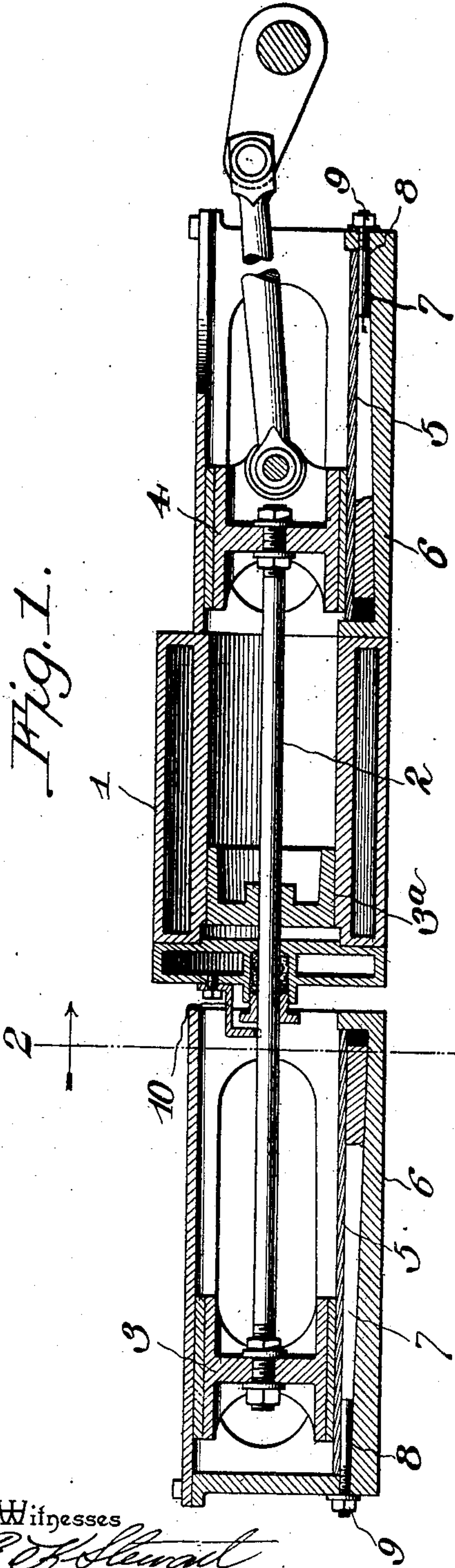
No. 762,572.

PATENTED JUNE 14, 1904.

C. W. BENN.
ENGINE.

APPLICATION FILED OCT. 21, 1903.

NO MODEL.



Witnesses
E. H. Stewart
J. W. Parker

C. W. Benn, Inventor.
by *C. A. Snow & Co.* Attorneys

UNITED STATES PATENT OFFICE.

CHARLES W. BENN, OF HASKINS, OHIO.

ENGINE.

SPECIFICATION forming part of Letters Patent No. 762,572, dated June 14, 1904.

Application filed October 21, 1903. Serial No. 177,983. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. BENN, a citizen of the United States, residing at Haskins, in the county of Wood and State of Ohio, have invented a new and useful Engine, of which the following is a specification.

This invention relates to certain improvements in engines, and is adapted particularly for use in connection with gas-engines, where the heat developed during the operation of the engine is such as to add considerably to the friction between the periphery of the piston and the inner wall of the cylinder.

The principal object of the invention is to so construct and arrange the piston and its connections as to relieve the lower portion of the inner wall of the cylinder from the weight of the piston and to this extent reduce the frictional contact between them.

A further object of the invention is to provide an engine in which the piston is provided with a rod extending through both ends of the cylinder and is supported by a pair of cross-heads that may be readily adjusted to compensate for wear and to maintain the piston in proper alinement with the cylinder, so that, especially in the operation of trunk-pistons, the cylinder will be relieved of the usual lateral thrust due to the direct connection with the crank-pin.

A further object of the invention is to provide in an engine of this class a simple and convenient means of effecting adjustment of the cross-heads without rendering it necessary to stop the engine.

A still further object of the invention is to provide an engine of this type with means for indicating the exact positions of the cylinder and piston with respect to each other, so that in case of wear the parts may be adjusted.

With these and other objects in view, as will hereinafter appear more fully, the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made

without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a longitudinal sectional elevation of sufficient of an engine to illustrate the application of my invention thereto. Fig. 2 is a transverse sectional elevation of the same on the line 22 of Fig. 1, showing the device for indicating the positions of the piston and its rod with respect to the cylinder. Fig. 3 is a detail perspective view of the cross-head-adjusting device.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

In engines as ordinarily constructed the weight of the piston rests directly on the lower portion of the inner wall of the cylinder, and the wear at this point is much greater than at any other point at which the piston and cylinder are in frictional contact. This is particularly true of explosive-engines, where the dry heat developed during the operation of the engine and the deposit of foreign matter due to unconsumed gases will increase the wear between the piston and cylinder. In gas-engines of the usual type, where trunk-pistons are commonly used, the lateral thrust on the piston, especially during the working and the compression strokes, will tend to make the wear uneven and render it necessary to frequently renew or repair the packing or to rebore the cylinder.

In carrying out the present invention the piston is supported within the cylinder in true alinement therewith, its weight being borne by sliding cross-heads arranged at the opposite ends of the cylinder and mounted on adjustable guides in order to permit the necessary adjustment of the parts in moving the piston into alinement and to compensate for wear without the necessity of stopping the engine.

In the drawings, 1 indicates the cylinder of a gas-engine open at the crank end and provided at its opposite end with a stuffing-box for the passage of a piston-rod 2, that is of sufficient length to project for a considerable distance beyond both ends of the cylinder. On

the piston-rod is secured a piston 3^a, which may be of any ordinary construction. The opposite ends of the piston-rod 2 are secured to cross-heads 3 and 4, the usual coupling connection between the cross-head 4 and the crank-shaft of the engine being employed, and these parts may be of the character ordinarily used in reciprocating steam-engines. Each of the cross-heads rests on a guide and wear plate 5, that is supported by a stationary plate 6, that may form a part of the frame of the engine, and between the two plates 5 and 6 is introduced a wedge-plate 7, the upper surface of the plate 6 being inclined, so that by longitudinal movement of the wedge-plate 7 the upper plate 5 may rest in a true vertical line. The wedge-plate 7 carries one or more bolts 8, that extend through suitable openings formed in the frame and are threaded for the reception of nuts 9, that may be adjusted to any desired extent in order to draw up on the wedge and elevate the cross-head. Inasmuch as the movement of the combined guide and wear plate 5 is in a true vertical line, the cross-head is allowed to operate without difficulty, even when the wear on the plate is such as to form ridges or walls at the opposite limits of movement of the cross-head.

In order to indicate the positions of the piston and rod with respect to the cylinder, there is employed an improved indicator 10, that is bolted to the cylinder-head and extends over and down to a point slightly above or in contact with the upper portion of the piston-rod, but is arranged in such manner as to prevent any perceptible wear on either the indicator or the rod from frictional contact with each other.

After the engine has been running for a considerable length of time the wear on the lower faces of the cross-heads and the upper faces of the plates 5 will be such as to lower the position of the rod and leave a slight space between the indicator and the rod. This immediately indicates that the friction between the piston and the inner wall of the cylinder is increasing, and the engineer by

turning the nuts 9 can draw up the wedge-plates 7 and elevate the cross-heads until the rod has assumed its proper position with respect to the indicator.

With an engine constructed in the manner described it is possible to support the piston within the cylinder without any appreciable wear between the two, and inasmuch as all of the wearing parts are outside the cylinder the necessary adjustment may be accomplished without stopping the engine.

It will of course be understood that the invention, while described as principally intended for use in connection with gas-engines, may be also employed in connection with engines using any fluid medium for power purposes.

Having thus described the invention, what is claimed is—

1. In engine construction, a cylinder, a piston, a piston-rod secured to the piston and projecting beyond both ends of the cylinder, cross-heads secured to the opposite ends of the piston-rod, wear-plates forming continuous supports for the whole stroke of the cross-heads, stationary supports arranged below the wear-plates and provided with inclined upper surfaces, wedge-plates interposed between the supports and the lower surfaces of the wear-plates and extending for approximately the length of the stroke, means arranged at the ends of the wedge-plates for effecting longitudinal adjustment thereof, substantially as specified.

2. In engine construction, a cylinder, a piston, a piston-rod projecting from both ends of the cylinder, cross-heads secured to the rod, adjustable wear-plates on which said cross-heads are supported, and an indicator carried by the head of the cylinder and arranged adjacent to the piston-rod.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CHARLES W. BENN.

Witnesses:

EARL BROWNE,
H. F. TWINING.