May 1, 1923.

1,453,518

W. T. PRICE

MAIN BEARING

Filed Aug. 7, 1920

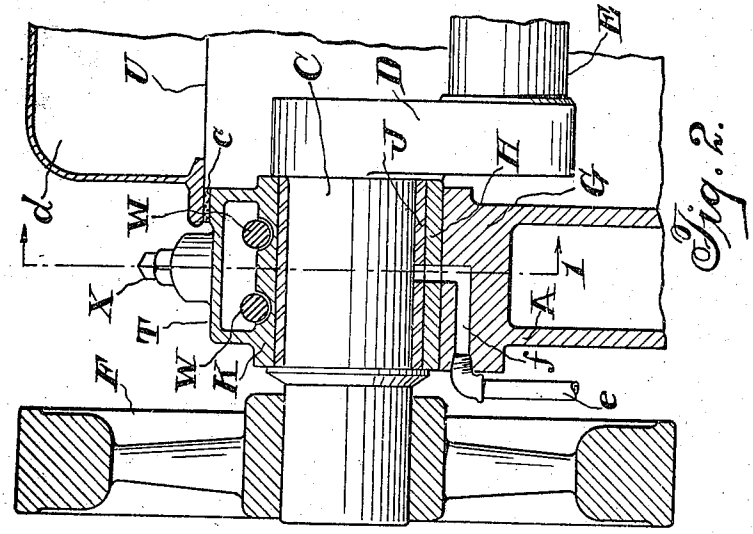


Fig. 2.

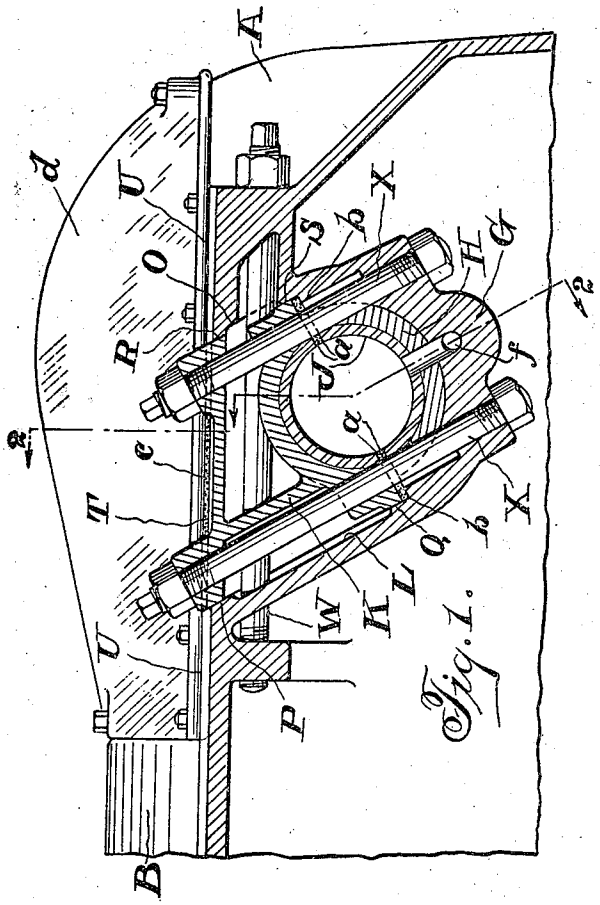


Fig. 1.

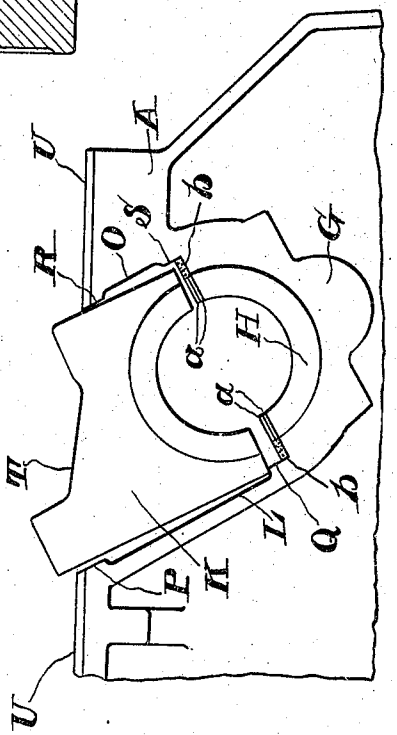


Fig. 3.

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UNITED STATES PATENT OFFICE.

WILLIAM T. PRICE, OF EASTON, PENNSYLVANIA, ASSIGNOR TO PRICE ENGINE CORPORATION, A CORPORATION OF NEW YORK.

MAIN BEARING.

Application filed August 7, 1920. Serial No. 401,850.

To all whom it may concern:

Be it known that I, WILLIAM T. PRICE, a citizen of the United States, residing at Easton, in the county of Northampton and State of Pennsylvania, have invented certain new and useful Improvements in Main Bearings, of which the following is a specification.

This invention relates to bearings for engines but more particularly to main bearings for horizontal single acting engines, such as oil, gas or steam-engines.

The primary objects of the invention are to secure a simple bearing which will effectively withstand the vertical forces due to the weights of the rotating parts, and the horizontal forces due to the pressure of the working fluid and the inertia of the reciprocatory masses. My bearing is adjustable approximately in the direction of the wear resulting from the combined action of the said forces, and is extremely rigid in the direction of the working force, so that there will be little if any tendency of the working force to introduce flexure or deflection into the frame or to distort the bearing surfaces.

Another object of the invention is to form a two part bearing having the top of the cap substantially in line with the top of the engine frame in order to make a continuous tight joint for an enclosing crank case cover, and a still further object is to provide a main bearing cap which is held tightly and rigidly in place, yet may be easily removed.

To all of these ends the invention is shown in one of its preferred forms in the accompanying drawings, in which—

Figure 1 is a vertical sectional view through the main bearing on the line 1—1 of Figure 2 looking in the direction of the arrows, but with the crank shaft removed.

Figure 2 is a vertical sectional view on the line 2—2 of Figure 1 looking in the direction of the arrows with the crank shaft in position, and

Figure 3 is a diagrammatic side elevation of the bearing showing the cap in process of removal.

Referring to the drawings, A represents a portion of the frame of a horizontal single acting engine and B represents a portion of the end of the cylinder which in this instance is integral with the frame. C represents the crank shaft having the crank D and crank pin E and F represents the fly wheel.

In this instance, the frame A is bored at G to receive the lower main bearing shell H which, with its babbitt lining J forms the lower part of the main bearing. As shown, the frame has an opening slotted at an angle to the vertical to permit the shaft C to be lowered into the bearing and to receive an upper part or cap K adapted to slide within said slotted opening. The side walls of the slotted portion of the frame are parallel to each other and are in this instance provided with recesses L and O across both their faces preferably of a depth in the walls of one thirty-second of an inch leaving guiding portions P and Q preferably in the same plane at the top and bottom of one side and guiding portions R and S preferably in the same plane at the top and bottom of the other side, so that the upper part or cap having parallel sides, preferably plane surfaces, is guided and fitted tightly sidewise in the bearing. The bottom guiding portions are preferably short to facilitate easy removal of the cap as will hereinafter appear. The slotted opening is preferably machined to the exact width of the cap or even a few thousandths of an inch narrower than the cap so that when the cap is forced to its position there is an initial stress in the frame tending to grip the cap tightly sidewise.

The top T of the upper part K, machined in this instance, is adapted to lie parallel with but slightly below the top U of the engine frame, also preferably machined.

In order to hold the cap K tightly sidewise in the slot, against the effect of the working forces, one or more tie members are provided in the form of tie bolts W passing through the cap and adapted to hold the sides of the slotted portion of the bearing tightly against the cap at all times. One or more cap bolts X are also provided for holding the cap downward in the slot and resisting whatever working forces may tend to raise it and also in this instance they have the further function of retaining the lower main bearing shell in its angular position and tightly against the bored surface of the frame.

Shims *a* are preferably arranged between the main bearing shell H and the cap K to retain the desired clearance between the

journal and the bearing and filling material, which may be in the form of felt *b* is packed between the shims and the sides of the slot, since it is desirable that the shims do not project over the outer edges of the said shell and since in this instance it is desirable to prevent the surging of air from the front of the engine piston through the parting of the bearing. In some instances the shims may be omitted and the dampening function of the sidewalls of the slotted opening depended upon to hold the cap rigidly in place, in which case the filling material may be extended over the entire parting and the shell would either be held in position by a dowel or other accepted device, or the shell could be omitted and the babbitt lining cast in the body of the bearing.

The upper part or cap is adjusted in position in the bearing with the top T lying parallel with, but slightly below the top U of the engine frame, and a filling piece *c* in this instance of soft packing material, is preferably inserted between the crank case cover *d* and the cap in order to close the opening between the crank case cover and the top of the cap and form a tight joint, even when on account of wear the shims have been removed and the cap lowered.

The cap K is held tightly and rigidly in place on account of the initial stress above referred to but may be easily removed because the clearances L and O in the sides of the slotted portion of the frame are adapted to free the cap K from the parallel guiding portions P and Q and R and S when the cap has been raised a fraction of the depth of the slot by a jacking screw, lever or other accepted device, which permits it to tip in the slot as indicated in Figure 3 so that it may be easily withdrawn. If desired, the clearance O in the short side could be omitted, but is preferably provided.

The bearing is oiled in any suitable manner as by means of the pipe *e* communicating with the oil passage *f* leading to the bearing.

I claim:

1. A main bearing comprising an engine frame having a slot therein the longitudinal axis of which is oblique to the vertical and in substantially the line of bearing wear, a bearing part in the closed end of said slot, a cap having a part adapted for insertion into the open end of said slot, having side surfaces fitting corresponding surfaces of said slot and a bearing part co-acting with said first bearing part, means for relatively adjusting said bearing parts lengthwise of the slot and for binding them securely in place, and means acting crosswise of the slot for binding said corresponding surfaces of said slot and cap together, said means being distinct from each other and separately operable at different times into definite final positions.

2. A main bearing comprising an engine frame having a slot therein the longitudinal axis of which is oblique to the vertical and in substantially the line of bearing wear, a bearing part in the closed end of said slot, a cap having a part adapted for insertion into the open end of said slot, having side surfaces fitting corresponding surfaces of said slot and a bearing part co-acting with said first bearing part, lengthwise and crosswise tie bolts for binding said bearing parts securely but adjustably in place, the former extending substantially in the direction of bearing wear and the latter in the direction of the working force.

3. A main bearing comprising a slotted engine frame, a bearing part in the closed end of said slot, a second bearing part adapted to cooperate with the first and movable in said slot, means acting lengthwise of the slot for adjusting and binding said bearing parts together, and means acting crosswise of the slot for binding the second bearing part therein, said means being distinct from each other and separately operable at different times into definite final positions.

4. A slotted frame having a bearing surface at its closed end, a part movable in said slot and having a bearing surface cooperating with the bearing surface at the closed end of the slot, lengthwise tie bolts engaging the slotted frame and said movable part to adjust and fix the latter relative to the former, and crosswise tie bolts clamping the slotted frame and the movable bearing part together.

5. A main bearing comprising a lower part slotted in line with the axis of said bearing at an angle to the vertical and fitted to receive an upper part and recesses in the sides of said slot adapted to free said upper part when it has been raised a fraction of the depth of said slot.

6. A main bearing comprising a lower part slotted in line with the axis of said bearing at an angle to the vertical and fitted to receive an upper part, recesses in the sides of said slot adapted to free said upper part when it has been raised a fraction of the depth of said slot, and a tie member for drawing the sides of the slot together to clamp said upper part.

7. A main bearing comprising a lower part slotted in line with the axis of said bearing at an angle to the vertical and fitted to receive an upper part, recesses in the sides of said slot adapted to free said upper part when it has been raised a fraction of the depth of said slot, a tie member for drawing the sides of the slot together to clamp said upper part, and means for holding said upper part downward in said slot.

8. A main bearing for an engine comprising a lower part opening upwardly at an angle, the walls of said opening being par-

allel and recessed, and having guiding portions at both sides at top and bottom, and an upper part adapted to slide within the said opening, the recesses being adapted to free the upper part from the parallel guiding portions when said upper part has been raised a fraction of the depth of the slot, thereby permitting the upper part to tip in the slot.

9. A main bearing comprising an engine frame slotted at an angle to receive a main bearing cap and bored to receive a bottom half main bearing shell, a main bearing cap fitting in said slot with the top parallel with the top of the frame, means for holding said end cap downward in said slot, a tie member above the journal of said bearing adapted to hold the cap tightly sidewise in said slot, and recesses in the sides of said slot adapted to free said cap when it has been raised a fraction of the depth of said slot.

10. A main bearing comprising an engine frame slotted at an angle to receive a main bearing cap and bored to receive a bottom half main bearing shell, a main bearing cap fitting in said slot with the top parallel with the top of the frame, means for holding said end cap downward in said slot, at least one horizontal tie bolt above the journal of said bearing adapted to hold the cap tightly sidewise in said slot, and recesses in the sides of said slot adapted to free said cap when it has been raised a fraction of the depth of said slot.

11. A main bearing for an engine, comprising an engine frame slotted at an angle to permit the shaft to be lowered into the bearing, an upper part having its sides fitted to the sides of said slot, the top of said upper part being adapted to lie parallel with, but slightly below the top of said engine frame, a cover adapted to make a tight joint with the top of said frame and a filling piece for closing the opening between the cover and the top of said upper part.

12. A main bearing comprising a lower part slotted in line with the axis of said bearing at an angle to the vertical and fitted to receive an upper part, said slot having one side longer than the other, and a recess in said longer side adapted to free said upper part when it has been raised a fraction of the depth of said slot.

In testimony whereof, I have signed this specification.

WILLIAM T. PRICE.