

No. 891,803.

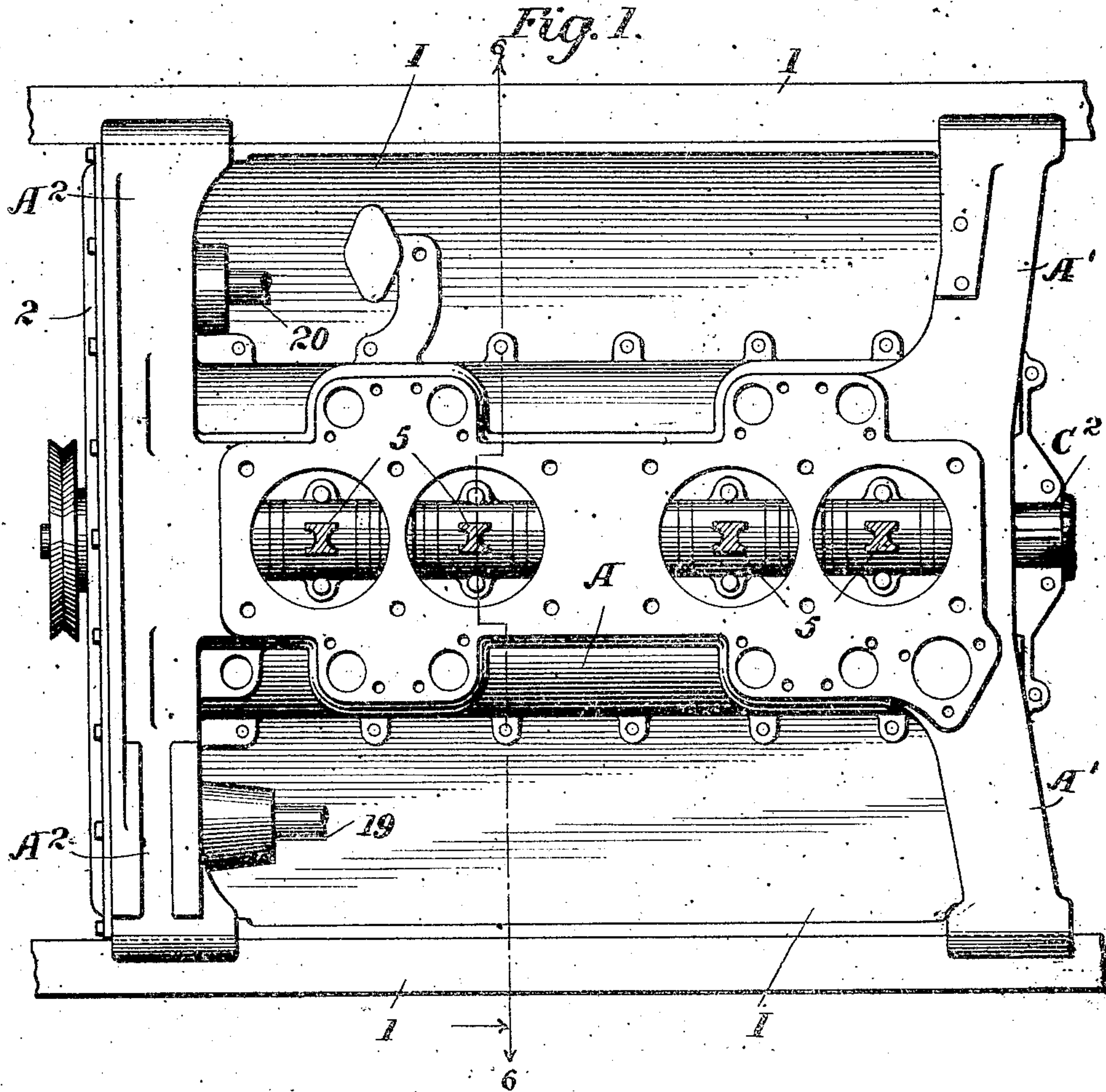
PATENTED JUNE 23, 1908.

H. B. JOY.

BASE AND CRANK CASE FOR HYDROCARBON ENGINES.

APPLICATION FILED MAY 21, 1906.

3 SHEETS—SHEET 1.



Witnesses  
J. J. Stinkell  
J. J. McCarty

Inventor  
H. B. Joy  
Foster Freeman Watson  
Attorneys

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3 SHEETS—SHEET 2.

Fig. 2.

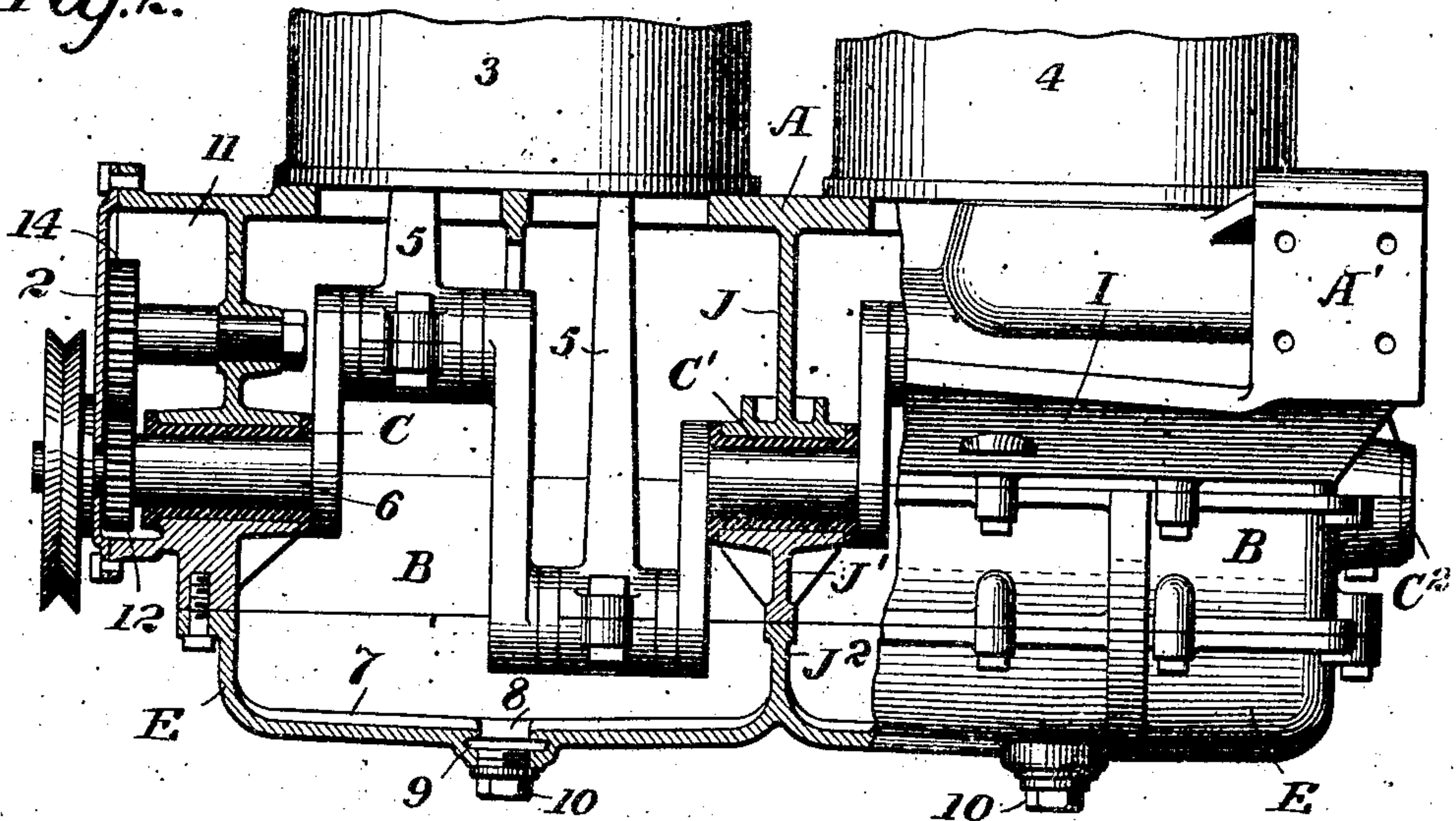


Fig. 3

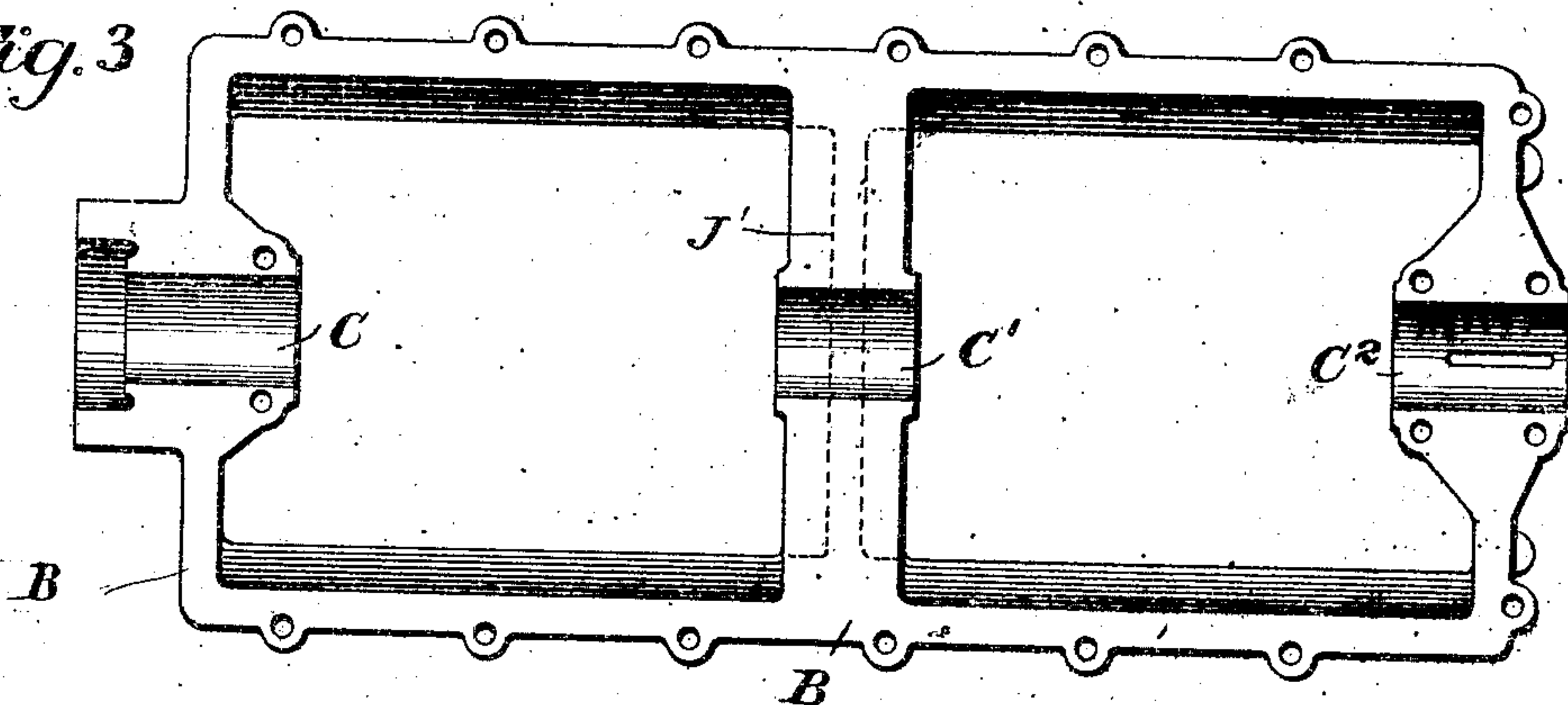
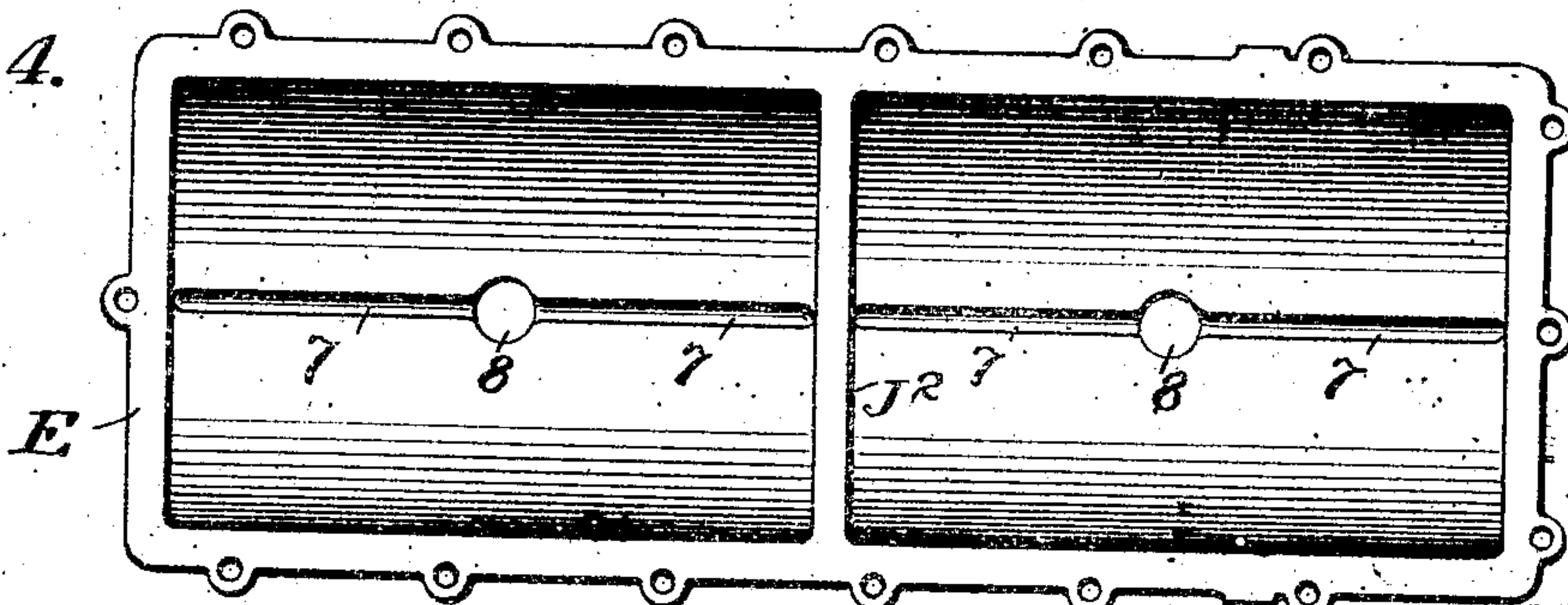


Fig. 4.



Witnesses

*J. M. McCarthy*

by

*Henry B. Joy*

*Foster Freeman Watson*  
Attorneys



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Fig. 5.

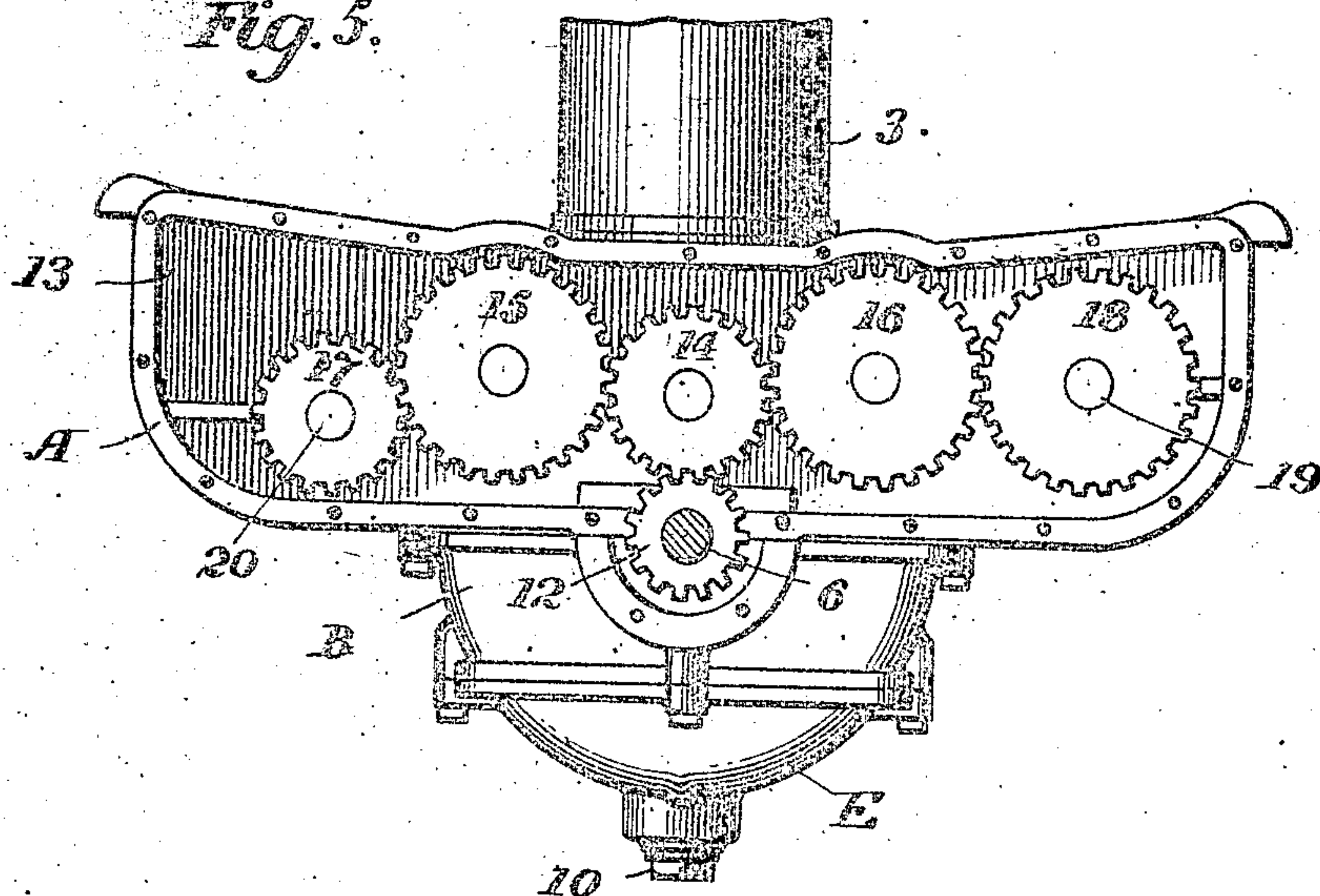
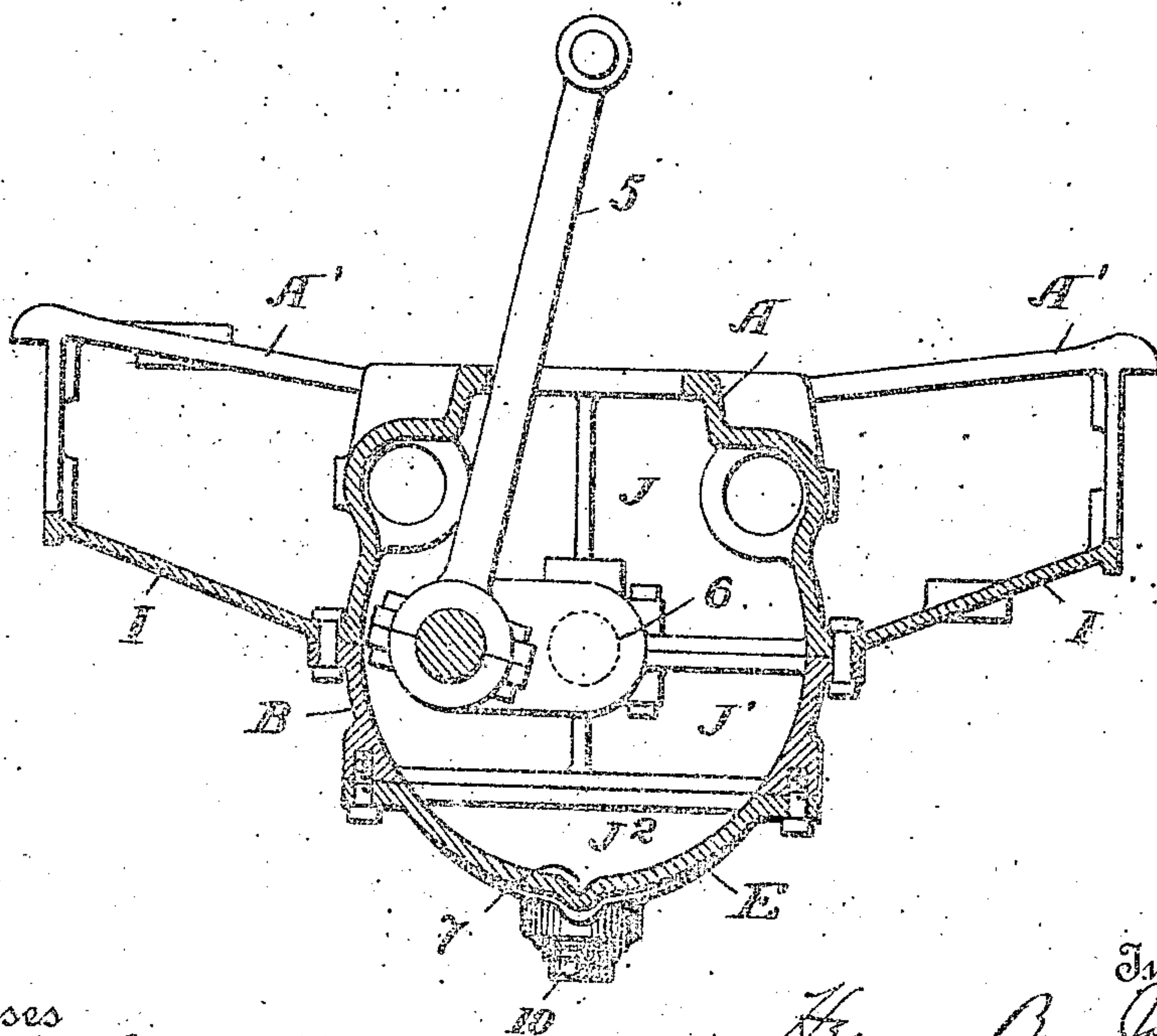


Fig. 6.



Witnesses  
J. G. Stinzel  
J. P. McCarthy

Inventor  
Harry B. Joy  
Foster, Freeman & Wilson  
Attorneys



# UNITED STATES PATENT OFFICE.

HENRY B. JOY, OF DETROIT, MICHIGAN, ASSIGNOR TO PACKARD MOTOR CAR COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF WEST VIRGINIA.

BASE AND CRANK-CASE FOR HYDROCARBON-ENGINES.

No. 891,803.

Specification of Letters Patent.

Patented June 23, 1902.

Application filed May 21, 1906. Serial No. 312,055.

*To all whom it may concern:*

Be it known that I, HENRY B. JOY, a citizen of the United States, and resident of Detroit, Wayne county, State of Michigan, have invented certain new and useful Improvements in Bases and Crank-Cases for Hydrocarbon-Engines, of which the following is a specification.

This invention relates to various improvements in means for supporting and lubricating hydrocarbon engines and more particularly to the crank case and its various adjuncts.

The invention will be described in connection with the accompanying drawings, in which,

Figure 1 is a plan view of the engine base and crank case, the engine cylinders being removed; Fig. 2 is a side view of the same partly in section through the crank shaft bearings; Fig. 3 is a top plan view of the middle section of the crank case; Fig. 4 is a top plan view of the bottom section of the crank case; Fig. 5 is an end view, the cover or end plate of the gear case being removed; and Fig. 6 is a section on the line 6—6 of Fig. 1, the crank being shown in different position.

Referring to the drawings the upper section A of the crank case is provided at one end with opposite outwardly extending arms A', the extremities of which rest upon the frame members 1, which, for instance, may be the side members of the frame of an automobile.

While my invention is primarily intended for use in automobiles, it is applicable to hydrocarbon engines for motor boats and other purposes and the frame members 1 may, for instance, be suitably connected to the frame of a motor boat. At the opposite end of the casing section A are hollow arms A'', the outer ends of which are also adapted to rest on the frame members 1. There is a continuous compartment or chamber extending throughout the arms A'' in which a series of gears, hereinafter referred to, are mounted, and this compartment or chamber is closed by means of a plate 2 fastened in position by suitable screws or bolts, as shown in Figs. 1 and 2.

Extending between the arms A', A'', on each side of the section A, and from the section A to the frame member 1, is a web or plate I forming a shield for preventing dust

from blowing from beneath up into the engine compartment and for catching oil and dirt dropping from the machinery above. These shields are especially important in automobiles as dust shields.

According to my present invention the crank case section A, the arms A', A'', and the shields I, I, are preferably cast in one piece. The shields stiffen and strengthen the supporting arms and the gear case in addition to their function as shields. It will be noted that the side frame members, the section A, the supporting arms, and the shields I form the sides and bottom of the lower part of the housing within which the engine is located.

Beneath the casing section A is a second section B, the two having flanged meeting edges and being separably connected by suitable means, such as screws or bolts. Below the section B of the casing is a dish-shaped section E which covers the lower opening in the section B, the meeting edges of the sections B and E being also detachably connected by suitable means, such as screws or bolts.

The engine illustrated is of the four-cylinder type, two cylinders being contained in the casing 3 and two in the casing 4, as shown in Fig. 2. From the piston of each cylinder a pitman 5 extends down to the crank shaft 6. The crank shaft has three bearings, two of which, C, C', are located in the ends of the crank casing while the intermediate bearing C'' is supported by a vertical transverse partition through the middle of the crank casing. The upper section J of this partition is located in, and preferably integral with, the upper section A of the crank case; the intermediate section J' of the partition is connected to and preferably integral with the middle section B of the crank case, while the lowest section J'' is within and preferably integral with the bottom section E of the crank case. The three partition sections, J, J', J'' form a continuous partition separating the crank case into two distinct compartments and serving the double purpose of supporting the middle crank shaft bearing and preventing all of the lubricating oil from running to one end of the casing when the engine is inclined one way or the other, as when an automobile is going up or down hill. As will be observed in the drawing, one-half of each of the three crank shaft



bearings is formed in the upper casing section A and the other half in the intermediate section B, these sections being separable provide for easy insertion and removal of the crank shaft. When the lower section E of the case is removed, the crank shaft is fully exposed and accessible for cleaning and repairs. The lower section is filled or nearly filled with oil when the engine is in a normal running condition and the crank shaft bearings, the pistons and the pitmans are lubricated by the splashing of this oil as the shaft revolves rapidly.

In the bottom of each compartment E are grooves 7 leading downwardly to a sediment pocket 8 which is preferably undercut, as shown at 9, to prevent sediment from being washed out by splashing of the cranks. The grooves or gutters 7 are preferably parallel with the crank shaft and the cranks impart to the oil a movement across the grooves, the tendency of any sediment in the oil being to drop into the grooves and gradually work down into the sediment pockets 8. As often as may be necessary a plug 10 is unscrewed from the bottom of the pocket and the sediment is removed.

Within the compartment 11 inclosed by the hollow arms A<sup>2</sup> is a train of gears which are driven by a spur gear 12 on the crank shaft 6. The shafts of gears are supported in bearings in the end wall 13 of the crank case section A. The gear 14 is an idle gear. The gears 15 and 16 operate the cam shafts which control the engine valves while the gears 17 and 18 are respectively fixed on shafts 20, 19, (Figs. 1 and 5), which shafts supply power to operate auxiliary devices of the engine. The shaft 19 may, for instance, be used to drive a magneto to supply current for the igniting devices and the shaft 20 may be used to operate a pump to circulate the cooling water for the engine.

Having described my invention what I claim and desire to secure by Letters Patent is,

1. In an automobile, the combination with two side frame members, of a crank-case consisting of three longitudinally-separable sections, to wit, the section A having laterally-extended arms which are secured to said side frame members, a bottom dish-shaped section E, and an intermediate section B, the section A being formed with the upper half of the crank-shaft bearings, and section B with the lower half of said bearings.

2. A crank-case consisting of three longitudinally-separable sections, to wit, the upper section A which carries the upper half of the crank-shaft bearings and has an internal partition-piece J which carries the upper half of the middle crank-shaft bearing, and an intermediate section B which carries the lower half of the crank-shaft bearings and has an internal partition-piece J' which carries the lower half of the middle bearing for

the crank-shaft, which partition-pieces J and J' divide the casing into independent chambers, and a lower dish-shaped section E removably secured to the lower edges of the section B and having a partition J<sup>2</sup>.

3. In an automobile, the combination with two side frame members, of a crank-case consisting of three longitudinally-separable sections, to wit, the section A having laterally-extended arms which are secured to said side frame members, a bottom dish-shaped section E, and an intermediate section B, the section A being formed with the upper half of the crank-shaft bearings, and section B with the lower half of said bearings, and two dust-guard plates secured respectively to the side frame members and to the sides of the casing member B.

4. In an automobile, the combination with two side frame members, of a crank-case consisting of three longitudinally-separable sections, to wit, the section A having laterally-extended arms which are secured to said side frame members, a bottom dish-shaped section E, and an intermediate section B, the section A being formed with the upper half of the crank-shaft bearings, and section B with the lower half of said bearings, and a gear-case formed on one end of said crank-case, which gear-case is provided with a removable end cap.

5. A crank-case consisting of three longitudinally-separable sections, to wit, the section A having laterally-extended arms, a bottom dish-shaped section E, and an intermediate section B, the section A being formed with the upper half of the crank-shaft bearings, and section B with the lower half of said bearings.

6. A combined base and crank case for a hydrocarbon engine comprising an upper section, an intermediate section, and a lower section all detachably connected, each of said sections having an integral partition midway of its length, the said partitions forming a wall which divides the case into two compartments, the said case having bearings for the crank shaft in its end walls and in said partition wall.

7. The combination with a hydrocarbon engine, of a combined base and crank case comprising an upper section provided with laterally extending supporting arms, an inclosed gear case and a middle partition; an intermediate section provided with inclosed ends and a middle partition and a bottom dish-shaped section having a middle partition, the adjacent portions of the ends and partitions of the upper and middle sections being provided with bearings for the crank shaft of the engine.

8. The combination with a suitable frame and a hydrocarbon engine, of a crank case having arms directly supported by said frame, said arms being hollow and forming a



gear case, and a train of gears mounted in said gear case.

9. The combination with a suitable frame and a hydrocarbon engine, of a crank case provided with arms directly supported by said frame, said arms being hollow and open at one side and forming a gear case, a plate for closing the open side of said gear case, and a train of gears mounted within said gear case.

10. The combination with the side frame members 1 and with a hydrocarbon engine, of a combined engine base and crank case arranged between said side frame members and provided with supporting arms extending laterally from the engine base and resting on said frame members, one pair of said arms being hollow and forming a continuous gear case for a train of gears.

11. The combination with the supporting side frame members 1, of the intermediate sectional crank case, and the dust shields I extending from the crank case to said side supporting members.

12. The combination with the supporting frame members 1, of the crank case having lateral arms supported at their extremities upon said frame members, and the dust shields I extending between said arms and between the crank case and said frame members.

13. The combination with a hydrocarbon engine, of a sectional engine base and crank case, the upper section comprising as an inte-

gral structure a pair of laterally extending supporting arms on each side, and a dust shield on each side extending between the arms.

14. The combination with a hydrocarbon engine, of a sectional engine base and crank case, the upper section comprising as an integral structure a pair of laterally extending supporting arms on each side, and a dust shield on each side extending between the arms, two of said supporting arms being opposite and hollow and constituting a gear case.

15. In an automobile, the combination with the side frame members and with an engine, of a combined engine base and crank case arranged between said side frame members and having arms extending laterally and resting on the said frame members, one of said arms being hollow and forming a gear case for a train of gears.

16. In an automobile, the combination with a hydrocarbon engine, of a sectional engine base and crank case, the upper section comprising in an integral structure a pair of laterally extending supporting arms on each side, one of said supporting arms being hollow and constituting a gear case.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY B. JOY.

Witnesses:

MARK C. TAYLOR,

LLEWELLYN W. CONKLING.