

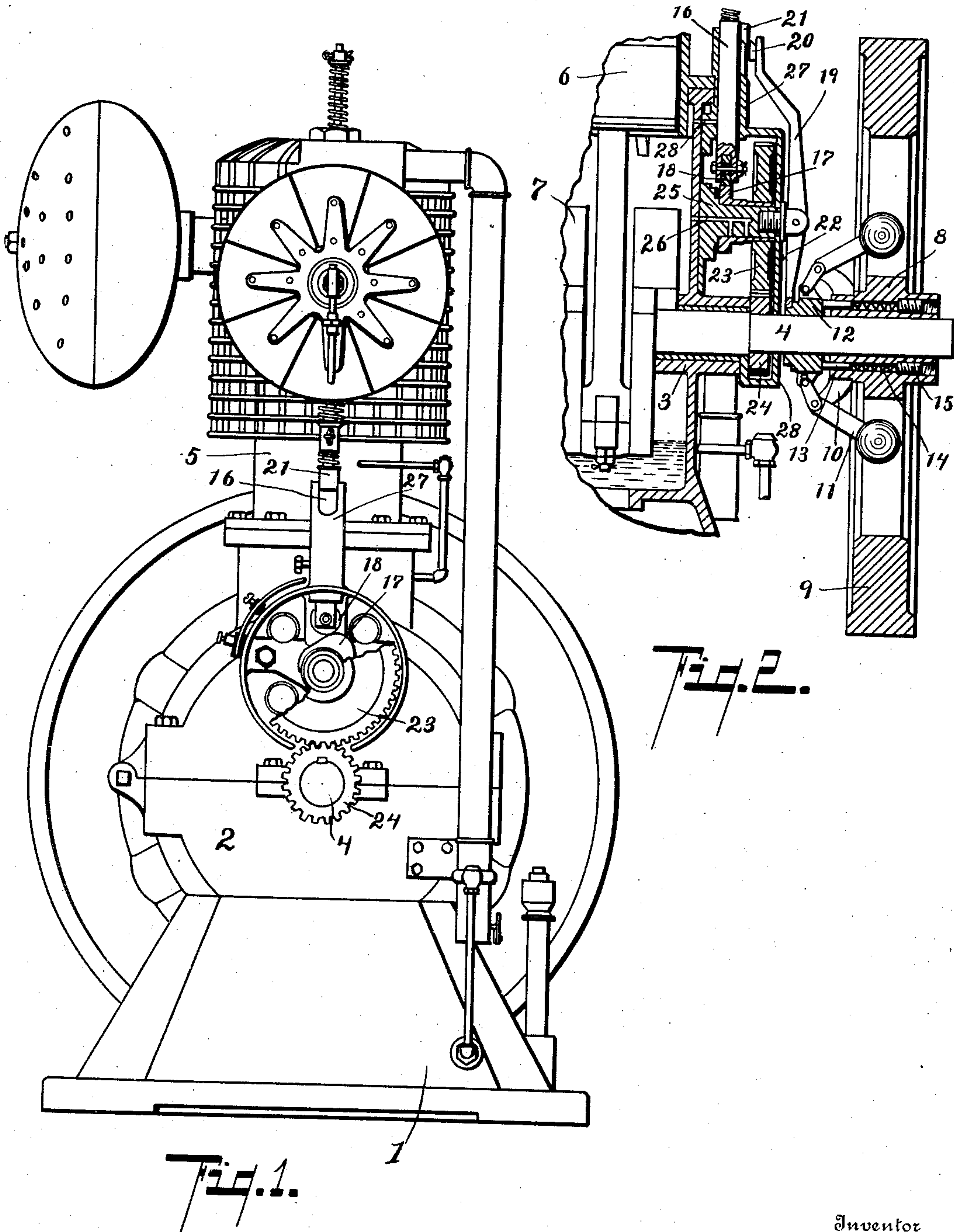
H. M. CRAMER.

EXPLOSION ENGINE.

APPLICATION FILED APR. 20, 1908.

924,640.

Patented June 15, 1909.



Witnesses

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# UNITED STATES PATENT OFFICE.

HARRY M. CRAMER, OF LANSING, MICHIGAN, ASSIGNOR TO THE "NEW WAY" MOTOR COMPANY, OF LANSING, MICHIGAN.

## EXPLOSION-ENGINE.

No. 924,640.

Specification of Letters Patent.

Patented June 15, 1909.

Application filed April 20, 1908. Serial No. 428,148.

*To all whom it may concern:*

Be it known that I, HARRY M. CRAMER, a citizen of the United States, residing at the city of Lansing, county of Ingham, State of Michigan, have invented certain new and useful Improvements in Explosion-Engines, of which the following is a specification.

This invention relates to improvements in explosion engines.

10 The main object of this invention is to provide in an explosion engine an improved means for lubricating the valve actuating cam and the gear connections of the crank shaft thereto which shall not only effectively  
15 lubricate the parts, but one which collects the lubricant so that it is not likely to drip or run out upon the exterior parts of the engine.

20 Further objects, and objects relating to structural details, will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

25 The invention is clearly defined and pointed out in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawing, forming a part of this  
30 specification, in which,

Figure 1 is a side elevation of a structure embodying the features of my invention, one of the balance-wheels and the governor mechanism proper and also the gear casing  
35 being removed to more effectively show the relation of the parts. Fig. 2 is a detail central vertical section of the structure shown in Fig. 1.

40 In the drawing, similar numerals of reference refer to similar parts in both views.

Referring to the drawing, the base 1 is of any suitable construction, and is preferably designed to serve as a storage for the liquid hydrocarbon. The crank shaft casing  
45 2 is mounted on the base and is provided with suitable bearings 3 for the crank shaft 4. The crank shaft casing is preferably adapted to serve as a receptacle for the lubricant. The cylinder 5 is mounted on the  
50 crank shaft casing, the inner end of the cylinder opening into the casing. The piston 6 is connected to the crank shaft in a suitable manner. Counterweights, as 7, are preferably provided for the crank shaft, and  
55 these counterweights and crank shaft arms,

as the crank shaft is revolved, are adapted to strike into the lubricant and atomize or break up the same, so that the air within the crank shaft is effectively charged with the lubricant. On the hub 8 of the balance-  
60 wheel 9 is a pair of inwardly-projecting arms 10 on which the governor weights 11 are pivotally mounted. The inner ends of these arms are engaged with the grooved collar 12, slidably mounted upon the crank  
65 shaft. The governor weights are held normally inward by means of the spring-pressed pins or blocks 13, the pressure springs 14 therefor being preferably ar-  
70 ranged in suitable chambers provided therefor in the hub of the balance-wheel. The tension of the springs is regulated by means of the threaded plugs 15. These parts are all substantially such as are shown in my  
75 application for Letters Patent filed November 19, 1906, Serial No. 344,032.

The exhaust valve actuating plunger 16—the exhaust valve not being shown—is actuated by a cam 17, the plunger being pro-  
80 vided with a roller 18 at its lower end adapted to rest normally upon the cam. When the speed of the engine exceeds a predetermined point, the collar 12 is drawn outwardly by means of the governor weights, which allows the upper end of the lever 19  
85 to swing in until the catch block 20 thereon engages the catch 21 on the valve-actuating plunger, holding the plunger in its elevated position so that the valve is not fully actu-  
90 ated and consequently the engine is not charged. The lever 19 is thrown into its engaging position by means of a coiled spring 22. The cam 17 is connected by the  
95 gears 23 and 24 to the crank shaft, the gear 24 being mounted on the crank shaft and the gear 23 being mounted on the hub of the cam. The journal 25 for the cam is pro-  
100 vided with a conduit 26 which opens into the crank shaft casing, so that, when the engine is in operation, the arms and balance-weight of the crank shaft strike into the lu-  
105 bricant, effectively atomizing the same, and on the outstroke of the piston, a portion of the lubricant-laden air is forced through the conduit 26 which opens to the bearing sur-  
110 face of the journal to properly lubricate the journal. The bearing 27 for the plunger rod is also connected to the crank shaft casing by means of a suitable lubricant conduit, as 28. The journal 25 and the lower



end of the bearing 27 for the valve actuating plunger are arranged in a gear casing 28 for the connecting gears for the cam to the crank shaft. This gear casing is also adapted to serve as a lubricant receptacle so that all of the waste or excess lubricant passing from the valve actuating cam and the valve plunger rod bearings is collected in the crank shaft casing and the gears suitably lubricated thereby, thus effectively utilizing the waste from the cam and plunger rod bearings.

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

1. In an explosion engine, the combination with a cylinder, of a piston; a crank shaft; a closed crank shaft casing adapted to serve as an oil reservoir; an exhaust valve; a plunger rod for actuating said exhaust valve; a cam for actuating said plunger; connecting gears for said cam to said crank shaft; a journal on which said cam and one of said connecting gears are mounted, said journal having a conduit therein opening into said crank shaft casing, said conduit being opened to the bearing surface of said journal; a bearing for said plunger mounted on said crank shaft casing, said bearing having a conduit therein opening into said crank shaft casing; and a gear casing for inclosing the said cam and said connecting gear therefor, the said gear casing being adapted to serve as an oil reservoir and arranged to collect the lubricant delivered from said cam and plunger bearings whereby the said gears are lubricated.

2. In an explosion engine, the combination with a cylinder, of a piston; a crank shaft; a closed crank shaft casing adapted to serve as an oil reservoir; a valve-actuating cam; connecting gears for said cam to said crank shaft; a journal on which said cam and one of said connecting gears are mounted, said journal having a conduit therein opening into said crank shaft casing, said conduit being opened to the bearing surface of said journal; and a gear casing for inclosing the

said cam and said connecting gear therefor, the said gear casing being adapted to serve as an oil reservoir arranged to collect the lubricant delivered from said cam bearing whereby said gears are lubricated.

3. In an explosion engine, the combination with a crank shaft, of a closed crank shaft casing adapted to serve as an oil reservoir; a cylinder opening into said casing at its inner end; an exhaust valve; a plunger for actuating said exhaust valve; a cam for actuating said plunger; a journal therefor mounted on said crank shaft casing; gear connections for said cam to said crank shaft; a gear casing inclosing said cam and gear, the lower portion of said gear casing being adapted to serve as an oil reservoir; a bearing for said plunger mounted on the top of said casing; and oil conduits leading to the bearings of said cam and plunger opening into said crank shaft casing whereby the lubricant is supplied to said bearings and collected in said gear casing to lubricate said gears, as specified.

4. In an explosion engine, the combination with a crank shaft, of a closed crank shaft casing adapted to serve as an oil reservoir; a cylinder opening into said casing at its inner end; a valve; a valve actuating cam; a journal therefor mounted on said crank shaft casing; gear connections for said cam to said crank shaft; a gear casing inclosing said cam and gear, the lower portion of said gear casing being adapted to serve as an oil reservoir; and an oil conduit leading to the bearing of said cam and plunger opening into said crank shaft casing, whereby lubricant is supplied to said bearing and collected in said gear casing to lubricate said gears, as specified.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

HARRY M. CRAMER. [L. S.]

Witnesses:

E. W. GOODNOW,  
S. B. SPALDING.