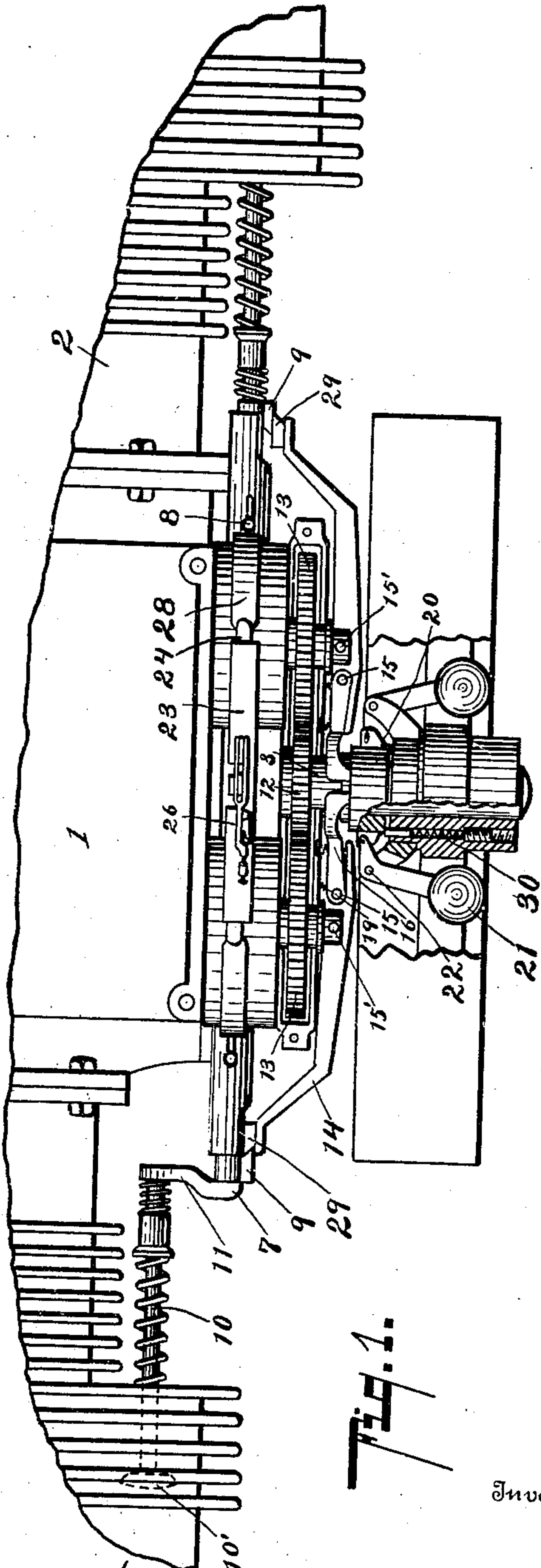
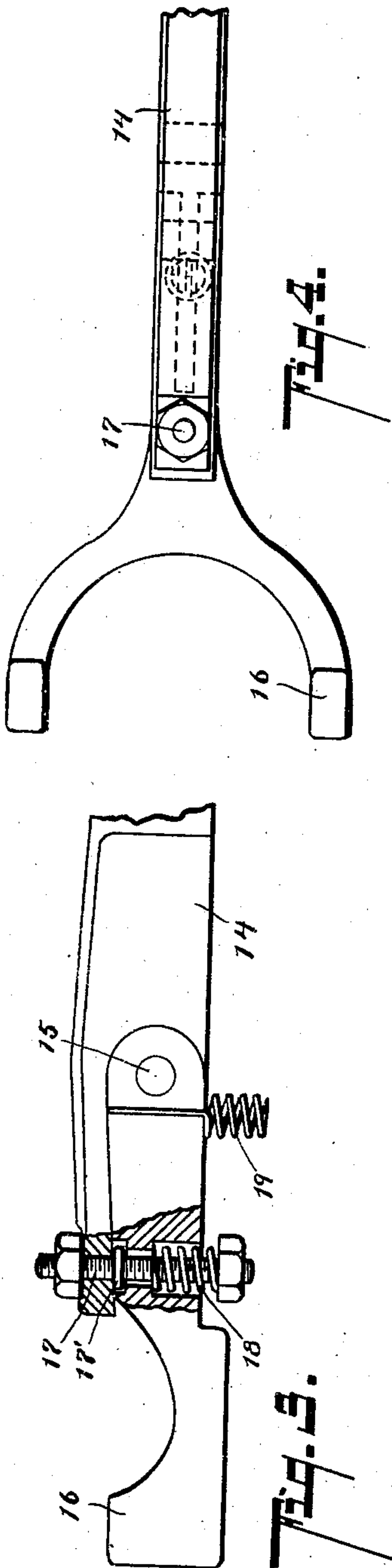


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SPARKER MECHANISM FOR ENGINES.
APPLICATION FILED APR. 20, 1908.

918,286.

Patented Apr. 13, 1909.
2 SHEETS—SHEET 1.



Witnesses

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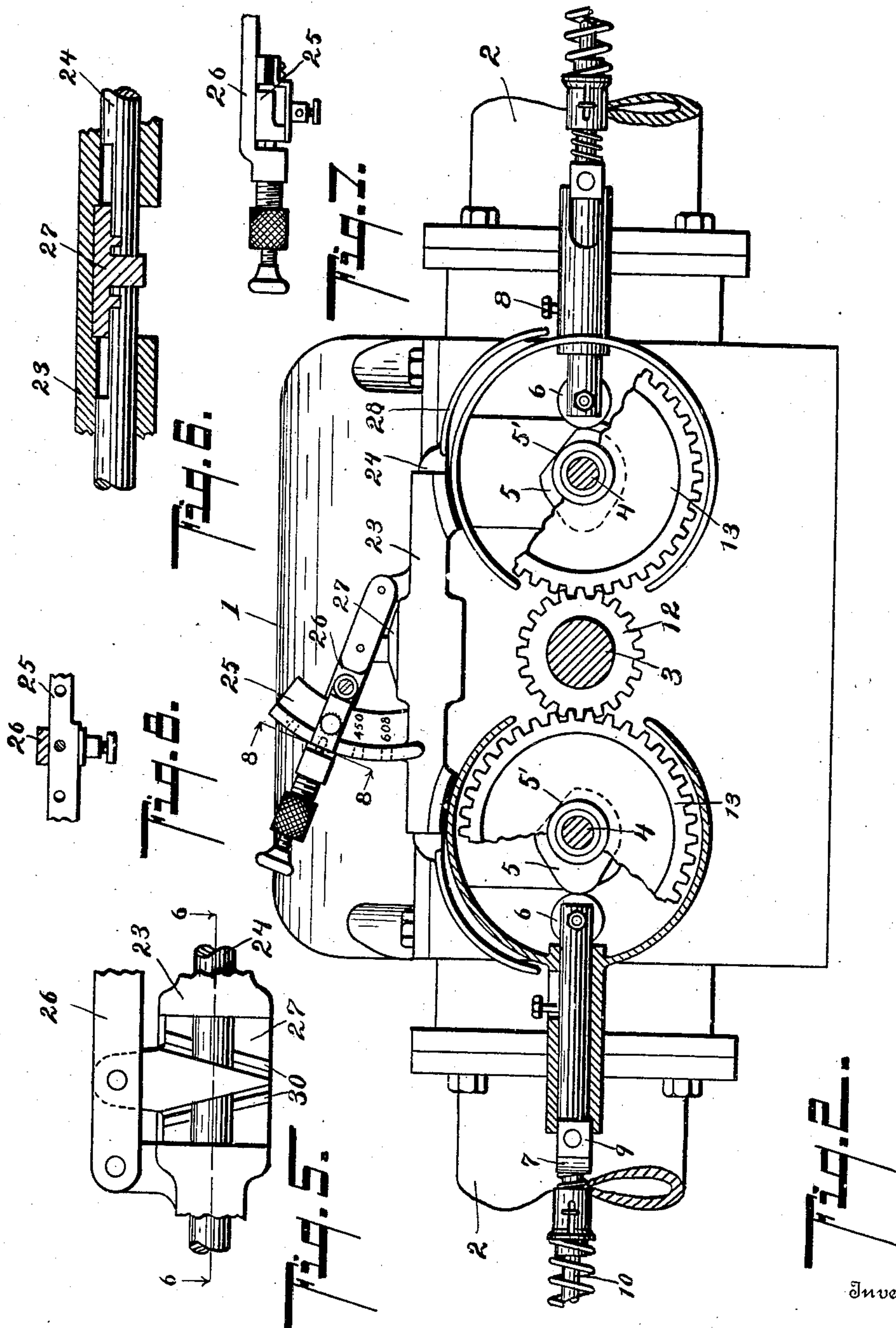
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UNITED STATES PATENT OFFICE.

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

SPARKER MECHANISM FOR ENGINES.

No. 918,286.

Specification of Letters Patent.

Patented April 13, 1909.

Original application filed April 12, 1907, Serial No. 367,843. Divided and this application filed April 20, 1908. Serial No. 428,147.

To all whom it may concern:

Be it known that I, HARRY M. CRAMER, a citizen of the United States, residing at Lansing, Michigan, have invented certain new and useful Improvements in Sparker Mechanism for Engines, of which the following is a specification.

This invention relates to improvements in sparkers for explosion engines.

My improved sparker mechanism for explosion engines is particularly designed for use with, and is here shown adapted to the governor mechanism shown in my application for Letters Patent filed April 12, 1907, Serial No. 367,843, this application being a divisional application thereof, although this invention may be adapted for and is desirable for use in other relations.

The main objects of this invention are: first, to provide an improved sparker mechanism for explosion engines having a plurality of cylinders by which the sparking for the two cylinders is properly timed, and one in which, when the speed of the engine exceeds a predetermined rate, the sparking is automatically prevented. Second, to provide an improved sparking mechanism for explosion engines in which the sparking is properly timed and one in which the electrical connections for the igniter mechanism are automatically disconnected when the speed of the engine exceeds a predetermined rate.

Further objects, and objects relating to details of construction, 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.

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 specification, in which,

Figure 1 is a detail plan of a structure embodying the features of my invention, portions being broken away to better show the relation of the parts. Fig. 2 is a detail enlarged vertical section, showing the relation of the valve actuating cams, plungers and sparker contact members. Fig. 3 is an enlarged detail plan of the inner end of one of the levers 14, parts being broken away to better show the arrangement of the parts. Fig. 4

is a detail side elevation thereof. Fig. 5 is an enlarged detail side elevation of the support and adjusting means for the contact members 28. Fig. 6 is a detail view, partially in longitudinal section, taken on a line corresponding to line 6—6 of Fig. 5. Fig. 7 is a detail section showing details of construction of the mechanism for adjusting the fixed contact members. Fig. 8 is a detail section taken on a line corresponding to line 8—8 of Fig. 2.

In the drawing, the sectional views are taken looking in the direction of the little arrows at the ends of the section lines, and similar numerals of reference refer to similar parts throughout the several views.

Referring to the drawing, 1 represents the engine base and the crank shaft casing thereof; 2 the engine cylinder; and 3 the crank shaft. Arranged, one at each side of the crank shaft, is a pair of cam shafts 4, having valve-actuating cams 5 thereon, the cams being provided with drops or depressions 5' on each side thereof, the object of which will definitely appear later. Exhaust valves, as 10', are arranged to be actuated by the push rods or plungers, 7, which are arranged to engage the valve stems 10. The plungers 7 are provided with rollers 6, adapted to travel on the cams 5. The plungers are provided at their outer ends with laterally projecting arms 11 on which the valve stems 10 rest.

The cam shafts 4 are connected to the crank shaft by gears 12 and 13, the gears 13 being arranged on the cam shafts and the gear 12 on the crank shaft. These gears are preferably proportioned two to one so that the cam shafts are driven at half the speed of the crank shaft.

A pair of levers 14, having inner yielding sections 16, is provided. The levers 14 are pivoted at 15' and are provided with latch blocks 29 at their outer ends, adapted to engage the catches 9 on the valve-actuating plungers 7. The yielding sections are secured to the pivoted sections by pivots 15. The bolts 17 are adjustably secured to the inner end of the pivoted sections and are loosely arranged through the yielding sections 16.

The coiled springs 18, arranged on the bolts 17, hold the sections 16 yielding in position. The inner ends of the levers are held normally outward by the springs 19.

On the crank shaft is a collar 20, which is

adapted to be controlled by the governor weights 21, the governor weights being pivoted at 22 on suitable arms provided therefor on the fly-wheel hub. When the speed of the engine exceeds a predetermined rate, the collar 20 is drawn outwardly, thereby releasing the levers so that their outer ends are thrown inwardly by the springs 19, so that the latch blocks 29 engage under the catches 9 provided therefor on the valve-actuating plungers. When in this position, the levers prevent the closing of the exhaust valves, although they are reciprocated through a part of their normal stroke. When the speed of the engine falls, the collar 20 travels inwardly against the yielding portions of the levers 14, and as soon as the valve-actuating plungers are shifted to release the latch blocks 9, the levers 14 are thrown out of their engaging position.

The levers 14 are adjusted so that the catch blocks 29 may be engaged with the blocks 9 at the same time. The adjustment of the levers 14 is secured by means of the bolt 17 which is held in its adjusted position by suitable lock nuts, the collars 17' coacting therewith. This adjustment is of advantage as, for instance, if the inner end of one of the levers should be worn more than the other by the governor collar 20, the other lever would be adjusted to compensate for the wear.

It is evident that as the plungers are actuated alternately both the levers are not freed at the same time. The yielding portion of the levers, however, permits their being released successively. Were it not for this yielding feature of the levers, both would be forced out of engagement with the valve-actuating plungers at the same time, thereby releasing one or the other of them prematurely. A pair of spring contact members 28 are mounted on the end of the rods 24, which are adjustably arranged in suitable ways on the support 23.

At the inner ends of the rods 24 is a slide 27, having a V-shaped portion arranged between the ends of the rods and having converging ribs 30 arranged in suitable grooves provided therefor in the ends of the rods. By adjusting this slide the rods are drawn in or pushed out, thereby changing the position of the spring contact members 28, so that they are engaged by the contact members 8 carried by the valve actuating plungers earlier or later in the stroke of the plunger, as desired. This arrangement enables the exact timing of the sparking, the sparking mechanism being of the jump spark class, which is well understood and not here illustrated.

The slide 27 is operated by the lever 26, which is provided with a suitable segment 25. When the lever is raised to its highest point so as to draw the contact members 28 inwardly, they are engaged by the contact

members on the valve-actuating plungers very late in the stroke, thus causing a very late sparking, so that there is practically no chance for a "kick back." When the engine is started, the lever is forced downwardly, thereby moving out the contact members 28 to the desired point. When the lever 26 is in its outer position, the switch members carried thereby are thrown out of contact with the segment 25 thereby breaking the electrical connections and as a consequence stopping the engine. The structure by which this is accomplished is clearly illustrated in Figs. 2, 7 and 8.

It will be apparent that, when the exhaust valves are locked or held open, the charging of the engine is prevented, so that no charge is taken into the engine when running above a predetermined rate. This, of course, prevents waste of fuel. Another advantage is that, as the engine runs when the valve is held open, the cool air passing into and out of the cylinders cools the same, and also effectively cools the valve. By adjusting the tension springs 31, in the governor, the speed of the engine can be nicely regulated.

It is apparent that when the valve-actuating plungers are not operated the igniter mechanism is not operated, so that the electrical supply is not needlessly exhausted.

I have illustrated and described my improved sparker mechanism for explosion engines in detail in the form preferred by me on account of structural simplicity and effectiveness in use. I am, however, aware that it is capable of considerable variation in structural detail without departing from my invention, and I desire to be understood as claiming the same specifically, as illustrated, as well as broadly.

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

1. The combination of a pair of explosion engines, of a governor; exhaust valves for said engines; exhaust valve-actuating plungers; a pair of plunger-actuating cams, said cams having drops or depressions therein; levers having yielding portions, the yielding portions thereof being arranged to be acted upon by said governor, said levers being adapted to engage said plungers to hold the exhaust valves open when the speed of the engine exceeds a predetermined rate; a pair of relatively fixed spring contact members; contact members on said valve-actuating plungers, adapted to engage said spring contact members when said plungers pass into said depressions in said cams; and means for uniformly shifting said relatively fixed members, whereby they are engaged earlier or later in the stroke of the said plungers, as desired.

2. The combination with a pair of explosion engines, of a governor; exhaust valves

for said engines; exhaust valve-actuating plungers; a pair of plunger-actuating cams, said cams having drops or depressions therein; levers arranged to be acted upon by said governor, said levers being adapted to engage said plungers to hold the exhaust valves open when the speed of the engine exceeds a predetermined rate; a pair of relatively fixed spring contact members; contact members on said valve-actuating plungers, adapted to engage said spring contact members when said plungers pass into said depressions in said cams; and means for uniformly shifting said contact members, whereby they are engaged earlier or later in the stroke of said plungers, as desired.

3. The combination with a pair of explosion engines, of a governor; exhaust valves for said engines; exhaust valve-actuating plungers; levers having yielding portions, the yielding portions thereof being arranged to be acted upon by said governor, said levers being adapted to engage said plungers to hold the exhaust valves open when the speed of the engine exceeds a predetermined rate; a pair of relatively fixed spring contact members; contact members on said valve-actuating plungers, adapted to engage said spring contact members as said plungers are reciprocated; and means for uniformly shifting said contact members, whereby they are engaged earlier or later in the stroke of said plunger, as desired.

4. The combination with a pair of explosion engines, of a governor; exhaust valves for said engines; exhaust valve-actuating plungers; levers arranged to be acted upon by said governor, said levers being adapted to engage said plungers to hold the exhaust valves open when the speed of the engine exceeds a predetermined rate; a pair of relatively fixed spring contact members; contact members on said valve-actuating plungers, adapted to engage said spring contact members as said plungers are reciprocated; and means for uniformly shifting said contact members, whereby they are engaged earlier in the stroke of said plungers, as desired.

5. The combination with a pair of explosion engines, of exhaust valves for said engines; exhaust valve-actuating plungers; contact members carried by said plungers; a pair of relatively fixed contact members, adapted to be engaged by said contact members on said valve-actuating plungers as they are reciprocated; ways in which said relatively fixed contact members are adjustably supported; a slide having converging ribs arranged in suitable grooves provided therefor in said relatively fixed contact members; and means for shifting said slide whereby said contact members are shifted to cause them to be engaged by the said contact members carried by said plungers earlier or later in the stroke thereof, as desired.

6. The combination with a pair of explosion engines, of exhaust valves for said engines; exhaust valve-actuating plungers; contact members carried by said plungers; a pair of relatively fixed contact members adapted to be engaged by said contact members on said valve-actuating plungers as they are reciprocated; ways in which said relatively fixed contact members are adjustably supported; and means for uniformly and simultaneously shifting said relatively fixed contact members to cause them to be engaged by the said contact members carried by said plungers earlier or later in the stroke thereof, as desired.

7. The combination with a pair of explosion engines, of exhaust valves for said engines; exhaust valve-actuating plungers; contact members carried by said plungers; a pair of relatively fixed contact members adapted to be engaged by said contact members on said valve-actuating plungers as they are reciprocated; and means for uniformly and simultaneously adjusting said relatively fixed contact members to cause them to be engaged by said contact members carried by said plungers earlier or later in the stroke thereof, as desired.

8. The combination with a pair of explosion engines, of a governor; exhaust valves for said engines; connections for said governor to said valves whereby said valves are held open when the speed of the engine exceeds a predetermined point and adapted to successively release the valves when the speed of the engine falls below such rate; contact members connected to said valves to be operated when said valves are operated; a pair of relatively fixed contact members adapted to co-act with said contact members connected to said valves; and means for uniformly shifting said relatively fixed contact members whereby they are engaged earlier or later in the stroke of the plunger, as may be desired, or whereby they may be thrown out of their engaging position.

9. The combination with a pair of explosion engines, of a governor; exhaust valves for said engines; means for alternately actuating said valves; connections for said governor to said valves whereby said valves are held open when the speed of the engine exceeds a predetermined point, said connections being arranged to successively release the valves when the speed of the engine falls below such a rate; contact members connected to said valves to be operated in proper sequence with said valves when said valves are operated; and a pair of relatively fixed contact members adapted to coact with said contact members connected to said valves.

10. In an explosion engine, the combination with a governor, of an exhaust valve; a plunger adapted to actuate said exhaust

valve; a cam arranged to actuate said
plunger, said cam having a drop or depres-
sion therein; means controlled by said gov-
ernor for holding said plunger out of en-
5 gagement with said cam when the speed of
the engine is above a predetermined rate;
a relatively fixed electrical contact member;
a contact member carried by said plunger
adapted to engage said fixed contact mem-
10 ber when the plunger passes into said drop or
depression in said cam; and means for adjust-

ing said fixed contact member whereby the
contact member is caused to engage the same
earlier or later in the stroke of the plunger,
as may be desired.

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.