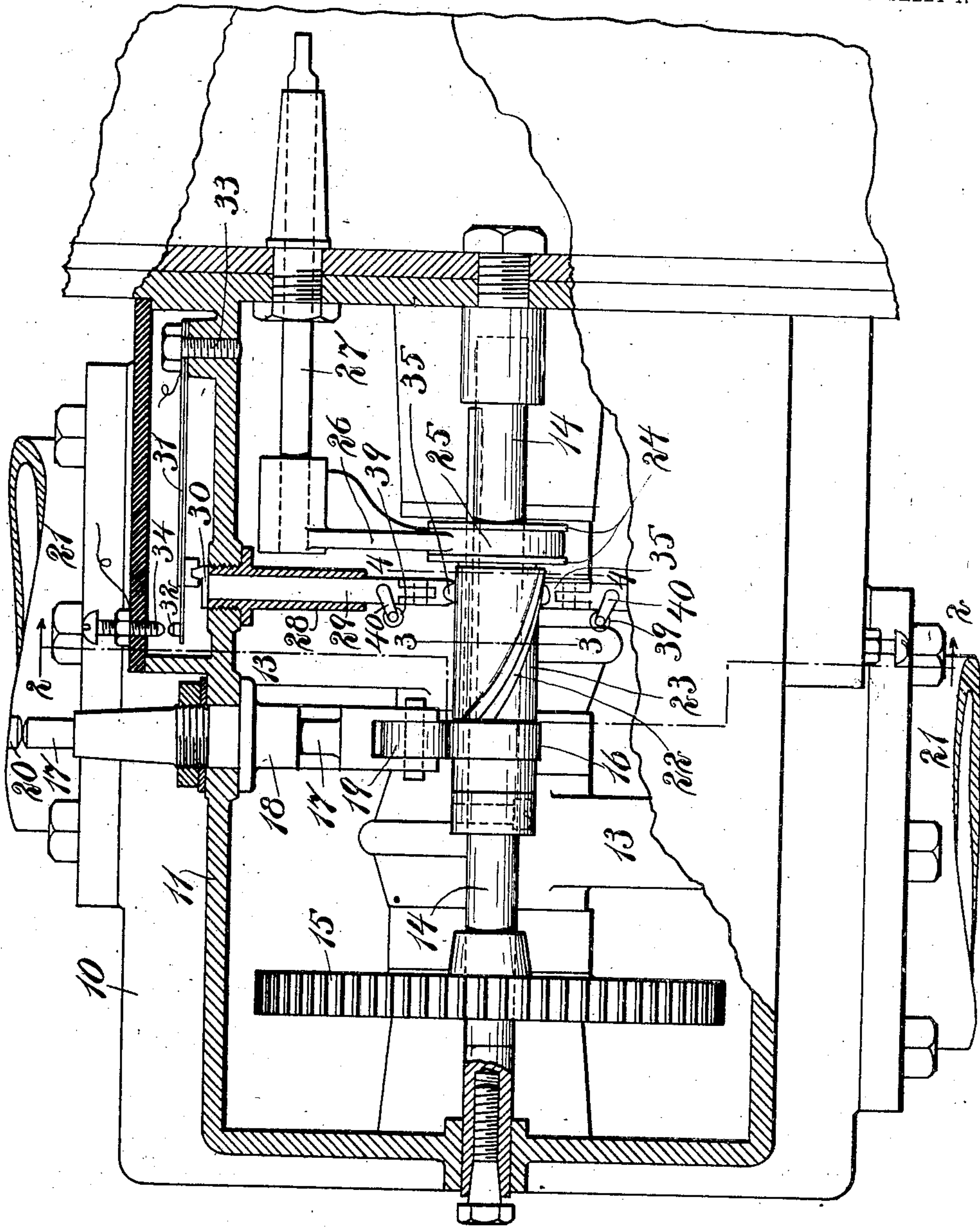


G. S. HILL.
SPARKING MECHANISM FOR AUTOMOBILES.
APPLICATION FILED NOV. 20, 1905.

920,326.

Patented May 4, 1909.
2 SHEETS—SHEET 1.



Witnesses:
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Fig. 1

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Fig. 2

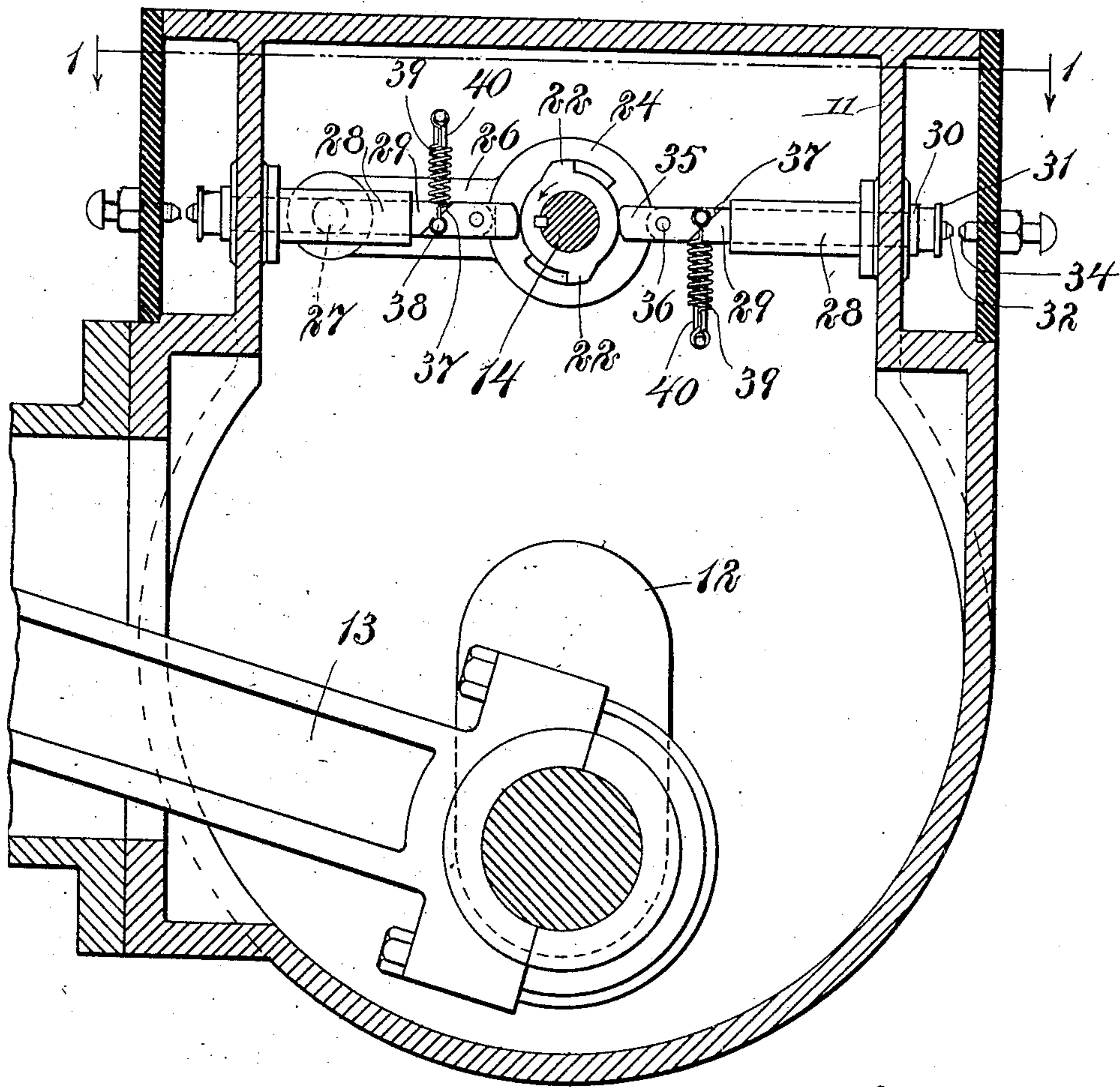
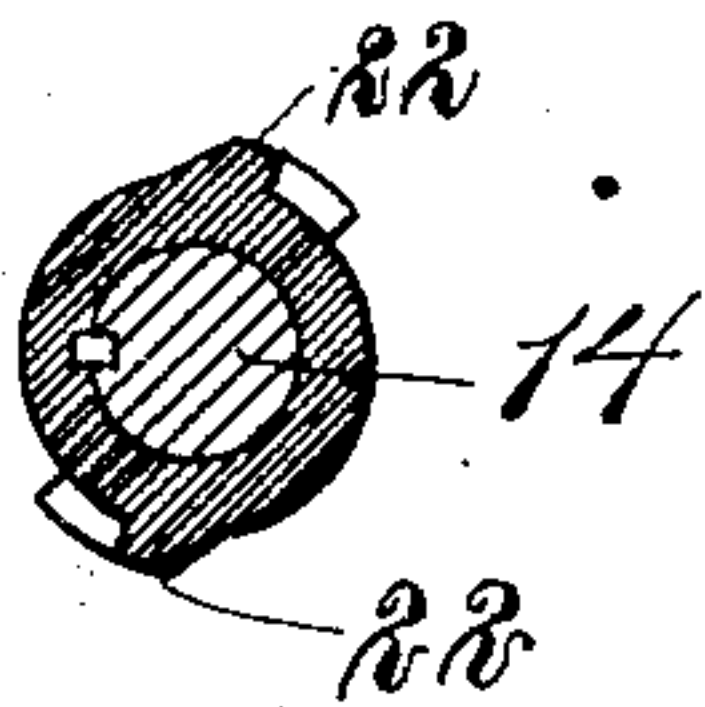


Fig. 3



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UNITED STATES PATENT OFFICE.

GEORGE S. HILL, OF BRADFORD, MASSACHUSETTS, ASSIGNOR TO HILL MOTOR CAR COMPANY,
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SPARKING MECHANISM FOR AUTOMOBILES.

No. 920,326.

Specification of Letters Patent.

Patented May 4, 1909.

Application filed November 20, 1905. Serial No. 288,227.

To all whom it may concern:

Be it known that I, GEORGE S. HILL, of
Bradford, in the county of Essex and State
of Massachusetts, have invented certain new
and useful Improvements in Sparking Mech-
anism for Automobiles, of which the follow-
ing is a specification.

This invention relates to sparking mech-
anism designed particularly for combustion-
engines of the four-cycle type.

The object of the present invention is to
provide an improved spark-timing cam de-
signed to produce a longer contact of the
sparkling devices when running at high speed
so as to properly charge the coil to produce
what is termed a "fat spark."

Another object of the invention is to pro-
vide improved means for preventing "back
fire" at such times as when starting the motor.

To these ends the invention consists in
the construction and combination of parts
substantially as hereinafter described and
claimed.

Of the accompanying drawings,—Figure 1
is a plan view of the sparking mechanism of a
combustion engine embodying my present
improvements, a portion of the casing being
broken out on substantially the line 1—1 of
Fig. 2. Fig. 2 represents a section on line
2—2 of Fig. 1. Fig. 3 is a detail section on
the line 3—3 of Fig. 1. Fig. 4 is a detail sec-
tion on the line 4—4 of Fig. 1.

Similar reference characters indicate the
same or similar parts in all the views.

The crank-casing is indicated at 10, said
casing having an upper portion 11 in which
the countershaft and the cams hereinafter
referred to are mounted. The crank-shaft
12, pitman 13, counter or cam-shaft 14, and
the gear 15 of the cam-shaft 14 are repre-
sented as of a form that is sufficiently well
known to not need detail description. Fixed
upon the cam-shaft 14 is a cam 16 which ac-
tuates the rod 17 mounted in bearing 18,
said rod having a roller 19 bearing on the
cam 16. The outer end of the rod 17 ac-
tuates a suitable valve-stem, one end of
which is indicated at 20 in Fig. 1.

21 indicates the cylinders.

The parts so far described form no part of
my present invention and need not be de-
scribed further than to say that the same
shaft 14 which carries the valve-actuating
cam 16 also actuates the spark-timing cams

22, thus providing a simple and reliable con-
struction.

The hub or sleeve 23 of the spark-timing
cams 22 is splined on the shaft 14 and is pro-
vided with collars 24 between which is fitted
a yoke or ring 25 carried at the end of an arm
26, said arm projecting from a sliding rod 27
which is operated by any preferred form of
controller (not shown). As the rod 27 is
shifted toward the right from the position
shown in Fig. 1, the hub 23 of the cams and
said cams carried thereby are also moved to-
ward the right so as to advance the timing of
the sparking mechanism, through the rods
and contacts hereinafter described.

Mounted to slide longitudinally in bearings
28 carried by the casing are contact-actuat-
ing plungers or rods 29. Each rod 29 is
formed at its outer end with a collar or head
30 which bears against a spring 31 having a
contact 32 at its free end and secured at the
other end by a binding-post 33. A fixed
contact 34 (which may be adjustable in the
usual manner of a screw-contact), is mounted
opposite the contact 32, the construction be-
ing such that the circuit will be simultane-
ously completed through the two pair of con-
tacts 32 and 34, when the rods 29 are actu-
ated by the spiral cams 22. By comparing
Figs. 3 and 4 with the other figures of the
drawing it will be seen that each spiral cam
22 is tapered in width so that when the hub
or sleeve bearing said cams is shifted toward
the right from the position shown in Fig. 1,
the contacts 32 and 34 will remain longer in
touch with each other so as to permit the pas-
sage of the current for a sufficient length of
time to fully charge the usual coil to enable
proper spark to be obtained when running at
high speeds. The cam-sleeve rotates in the
direction of the arrow in Fig. 2 and one side
of each spiral rib forming a cam 22 is in-
clined so as to properly ride over and thrust
outward the contact-actuating plunger or
rod on each side. The opposite side of each
rib is abrupt, substantially as shown in Fig.
2, so as to permit of a quick return of the rod
29 under the influence of the spring 31.

In order to avoid the "back fire" that
would result if the shaft 14 and cam-hub
should momentarily run in the reverse direc-
tion, I construct the contact-actuating plun-
gers or rods so that they will not be thrust
outward by the cams if the shaft should re-

tate in the wrong direction. The means which I have illustrated for attaining this result comprise a hinged or jointed inner end portion 35 of each rod 29, said inner end portion being pivoted to the rod 29 at 36 and formed with an inclined rear end 37 which is adapted to abut against a similarly formed shoulder of the rod 29. A spring 39 connects a pin 38 projecting from the pivoted end piece 35 with a bracket arm 40 connected with the rod 29, the tension of said spring being sufficient to hold the parts in the position shown in Fig. 2, when the inclined shoulder 37 of the pivoted ends or tips of the rods 29 are in contact with the corresponding stop-shoulder formed on said rod 29. When the cam is rotating in the direction of the arrow shown in Fig. 2, the lateral pressure exerted against the tip 35 by a cam will have no effect upon the rod 29 other than to thrust said rod outward, because the tip 35 can rock in but one direction on its pivot 36. But if the abrupt side of either cam 22 should strike the side of a tip 35, said tip will rock on its pivot 36, the spring 39 yielding to permit this movement. The rod 29, however, will not be moved outward and no circuit-making contact will occur, and consequently there will be no "back fire". The moment that a cam moving in the direction just described has passed the end 35, the spring 39 will restore it to normal position.

Having now described my invention, I claim:

35 1. A sparking mechanism for combustion-engines, comprising a shaft, a hub or sleeve splined thereon and having two tapering spiral cams thereon each having an inclined side and an abrupt side, means for shifting
40 said sleeve on the shaft in the direction of the axis of rotation of the shaft, spring contacts, rods mounted to reciprocate radially to said hub or sleeve and having their inner ends in engagement with the cams for simultaneous

actuation by said cams, and having their 45 outer ends adapted to actuate said contacts, a cam fixed to said shaft adjacent one end of the sleeve, and a valve-controlling rod actuated by the last mentioned cam.

2. A sparking mechanism for combustion- 50 engines, comprising a shaft, a rotary hub splined on said shaft and having two spiral tapering cams each having an inclined side and an abrupt side, plungers or rods mounted to reciprocate radially to said hub and 55 having tips pivoted to their inner ends and adapted to be engaged by said cams for simultaneous actuation by said cams, means for holding said tips normally in alinement with the rods but permitting said tips to 60 yield laterally, contacts actuated by said rods, a cam fixed to said shaft adjacent one end of the sleeve, and a valve-controlling rod actuated by the last mentioned cam.

3. A sparking mechanism for combustion- 65 engines, comprising a shaft, a rotary hub splined on said shaft and having two spiral tapering cams each having an inclined side and an abrupt side, contact actuating plungers or rods mounted to reciprocate radially 70 to said hub and having tips adapted to be engaged by said cams for simultaneous actuation by said cams, said tips being pivoted to the inner ends of the rods and having inclined rear ends, said rods having stop-shoulders 75 to be engaged by said inclined rear ends of the tips, springs for normally holding the tips in alinement with the rods, a cam fixed to said shaft adjacent one end of the sleeve, and a valve-controlling rod actuated by the 80 last mentioned cam.

In testimony whereof I have affixed my signature, in presence of two witnesses.

GEORGE S. HILL.

Witnesses:

M. B. MAY,
C. C. STECHER.