

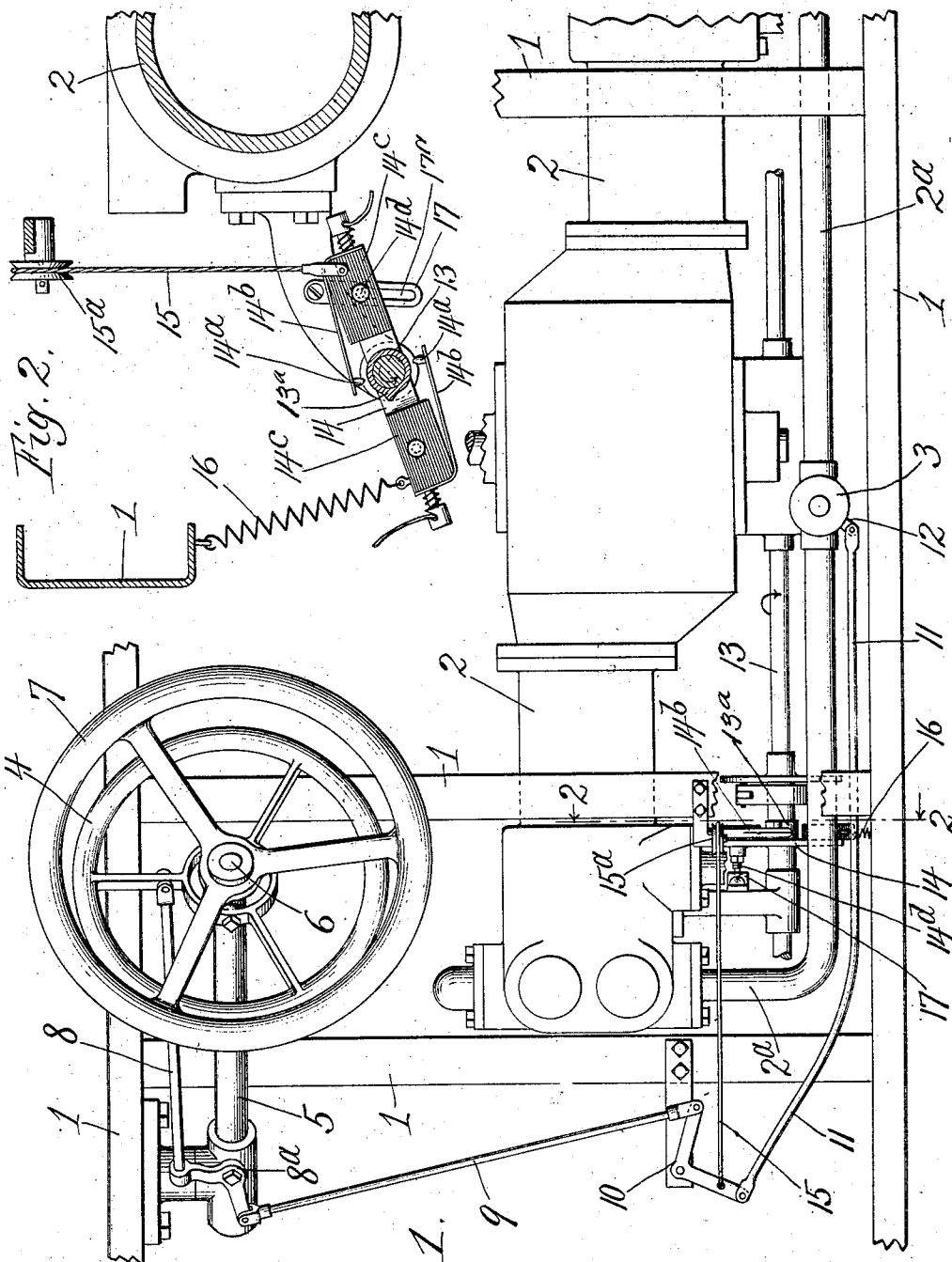
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PATENTED MAY 1, 1906.

T. B. JEFFERY.

SPARKING IGNITER ADJUSTING DEVICE FOR EXPLOSIVE ENGINES.

APPLICATION FILED MAR. 20, 1905.



Witnesses.
Edward T. Wray.
Fred B. Fischer

Fig. 1.

Inventor.
Thomas B. Jeffery.
by *Antony Edison*
his Atty's.

UNITED STATES PATENT OFFICE

THOMAS B. JEFFERY, OF KENOSHA, WISCONSIN.

SPARKING-IGNITER-ADJUSTING DEVICE FOR EXPLOSIVE-ENGINES.

No. 819,283.

Specification of Letters Patent.

Patented May 1, 1906.

Application filed March 20, 1905. Serial No. 251,168.

to all whom it may concern:

Be it known that I, THOMAS B. JEFFERY, a citizen of the United States, residing at Kenosha, in the county of Kenosha and State of Wisconsin, have invented new and useful Improvements in Sparking-Igniter-Adjusting Devices for Explosive-Engines, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved mechanism for regulating the time of sparking or ignition in an explosive-motor, so as to adjust the sparking with relation to the amount of supply of explosive fluid.

It consists of the features of construction set out in the claims.

In the drawings, Figure 1 is a plan view of a portion of a motor-car and driving mechanism equipped with my invention. Fig. 2 is a detail section at the line 2 2 on Fig. 1.

Upon the vehicle-frame 1 the motor 2 is mounted in any suitable manner and is supplied with the explosive motive fluid through a pipe 2^a, the supply being controlled or regulated by the supply-valve 3. This valve is controlled at will by the operator, the mechanism for that purpose comprising the rocking wheel or hand-lever 4, which is pivoted for rocking on the standard 5, in which the steering-shaft 6 is mounted and journaled, having at the upper end the steering-wheel 7. A link 8 from the rocking handle 4 extends downward to one arm of the bell-crank lever 8^a, fulcrumed on the lower bearing of the steering-shaft 6, and from the other arm of said bell-crank lever a link 9 extends across the vehicle and is connected with one arm of a bell-crank lever 10, of which the other arm is connected by a link 11 with the lever-arm 12 on the stem of the valve 3, the connections being adapted to cause the valve to be operated for closing by rocking the hand-wheel 4 downward at the side at which the link 8 is connected.

The contact making and breaking device for producing the igniting spark may be of any well-known construction, provided it involves (as is usual) two contact-making points, of which one is on a rotating part and the other on a part which is adjustable about the axis of the rotating part, so as to vary the

point in the rotation at which the contact occurs. In the construction illustrated the rotating part is the cam 13^a, carried on a shaft 13, which is driven in the customary manner by the engine, being geared with the main shaft so as to have one complete revolution for each complete cycle of the engine's action, being two revolutions of the main shaft. The adjustable part is the lever-arm 14, mounted for swinging about the shaft 13 and having the contact-making point 14^a, carried on a spring-arm 14^b, which is mounted on an insulating-block 14^c on the arm 14. From said arm 14 a flexible cable 15 extends around a suitable guide 15^a to the same arm of the bell-crank lever 10 which is connected by the link 11 with the supply-valve 3, the arrangement of the guides being such that the movement of the bell-crank lever for closing the valve draws on the cable and when the cable is taut moves the arm 14 in the direction to retard ignition by setting the contact-point 14^a farther ahead in the path of rotation of the contact-point on the rotating cam 12. A spring 16, connected with the arm 14 and the frame 1 of the vehicle, operates to retract it in the direction for advancing the ignition. A link 17, connected with the frame-bearing, has a slot 17^a, in which a stud 14^d on the arm 14 plays as the arm 14 is rocked, the length of the slot being adequate for the full range of rocking movement required of said arm 14 for changing the point of ignition from most advanced to most retarded position.

When the valve-moving mechanism is operated for opening the valve, starting from the position at which the valve is closed and the sparking device set for most delayed ignition, the cable 15 is taut, and the first portion of the opening movement of the valve permits the arm 14 to be retracted by the spring to advance the ignition gradually as the supply of motive fluid increases. When the action has proceeded so far that the stud 14^d reaches the limit of the slot 17^a in the link 17, the sparking-point is at most advanced position and further opening movement of the valve slacks the cable without changing the sparking-point. When the valve-moving devices are operated for closing the valve, such closing movement continues to the extent necessary for taking up the slack of the cable before any change in the sparking-point is

made. The purpose and effect of this range of adjustment of the parts is to delay the ignition correspondingly to the diminution of the supply of motive fluid after such diminution has already been made to the point for moderate power. This makes it possible to keep the ignition-point advanced to the position for getting the maximum explosive effect from a given moderate quantity of motive fluid, so that adequate power may be obtained even at slow speed for certain work; as climbing grades, in which high speed is impracticable, but a large amount of power is requisite, and it also makes it possible to reduce the speed by the combination of two causes operating simultaneously: to wit, (a) diminution of the quantity of explosive fluid and (b) a retarding of the ignition, so that a higher power can be obtained at the slow speed than if the reduction of speed was effected either by reducing the charge alone or by retarding the ignition alone, since if the reduction of the charge alone were relied upon for reduction of the speed the charge would be liable to become so weak as to be non-explosive, and, on the other hand, if retarding of the spark alone were relied upon the reduction of compression at the instant of sparking might render the charge non-explosive; but by changing both the charge and the point of sparking an effectively-explosive charge can be retained and exploded at the low speed.

I claim—

1. In an explosive-engine in combination with a valve for controlling the supply of motive fluid, a contact making and breaking device comprising a rotatable element and an adjustable element; movable devices for operating the supply-valve; a flexible cable connecting the said supply-valve-operating devices and the adjustable element of the contact device, and a guide about which the same passes located for causing said adjustable element to be moved positively in direction for delayed ignition by the valve-closing movement of the valve-operating devices, and a spring for retracting said adjustable element upon the reverse movement of said devices.

2. In an explosive-engine in combination with a valve for controlling the supply of motive fluid, a contact making and breaking device comprising a rotatable element and an adjustable element; movable devices for operating the supply-valve; a flexible cable connecting said supply-valve-operating devices and the adjustable element of the contact device, and a guide about which the same passes located for causing the adjustable device to be moved in direction for advanced ignition by the valve-opening movement of the valve-operating devices; a spring for retracting the said adjustable element upon the reverse

movement of said devices, and a stop limiting said retracting movement of the adjustable element.

3. In an explosive-engine in combination with a valve for controlling the supply of motive fluid, a contact making and breaking device comprising a rotatable element and an adjustable element; means for operating the supply-valve at will; a spring for yieldingly holding said adjustable element at the limit of its range of movement for advanced ignition, and connections between said adjustable element and the valve-operating means operating by pulling to retract the adjustable element against the action of the spring in the movement for closing the supply-valve.

4. In an explosive-engine in combination with a valve for controlling the supply of motive fluid, a contact making and breaking device comprising a rotatable element and an adjustable element; means for operating the supply-valve at will; a spring for yieldingly holding said adjustable element at the limit of its range of movement for advanced ignition, and connections between said adjustable element and the valve-operating means operating by pulling to retract the adjustable element against the action of the spring in the movement for closing the supply-valve, said connections being adapted to yield so as to be inoperative in pushing.

5. In an explosive-engine in combination with a valve for controlling the supply of motive fluid, a contact making and breaking device comprising a rotatable element and an adjustable element; means for operating the supply-valve at will; a spring for yieldingly holding said adjustable element at the limit of its range of movement for advanced ignition, and connections between said adjustable element and the valve-operating means operating by pulling to retract the adjustable element against the action of the spring in the movement for closing the supply-valve, said connections being adapted to yield so as to be inoperative in pushing, the range of movement of the valve-operating connections for opening and closing the valve being greater than that of said adjustable device, and the connections being arranged to cause the valve to be closed when said adjustable element is at the limit of its movement for delayed ignition.

6. In an explosive-engine in combination with a valve for controlling the supply of motive fluid, a contact making and breaking device comprising a rotatable element and an adjustable element; means for operating the supply-valve at will; a spring for yieldingly retracting said adjustable element to the limit of its range of movement for most advanced ignition, and a flexible cable connecting said element with the valve-operating means adapted to operate by pulling on said

adjustable element against the action of its
spring in the valve-closing movement, and to
hold said element at the limit of its range of
movement for delayed ignition when the
5 valve is closed.

In testimony whereof I have hereunto set
my hand, in the presence of two witnesses, at

Chicago, Illinois, this 30th day of January,
A. D. 1905.

THOS. B. JEFFERY.

Witnesses:

K. E. JEFFERY,
CHAS. S. BURTON.