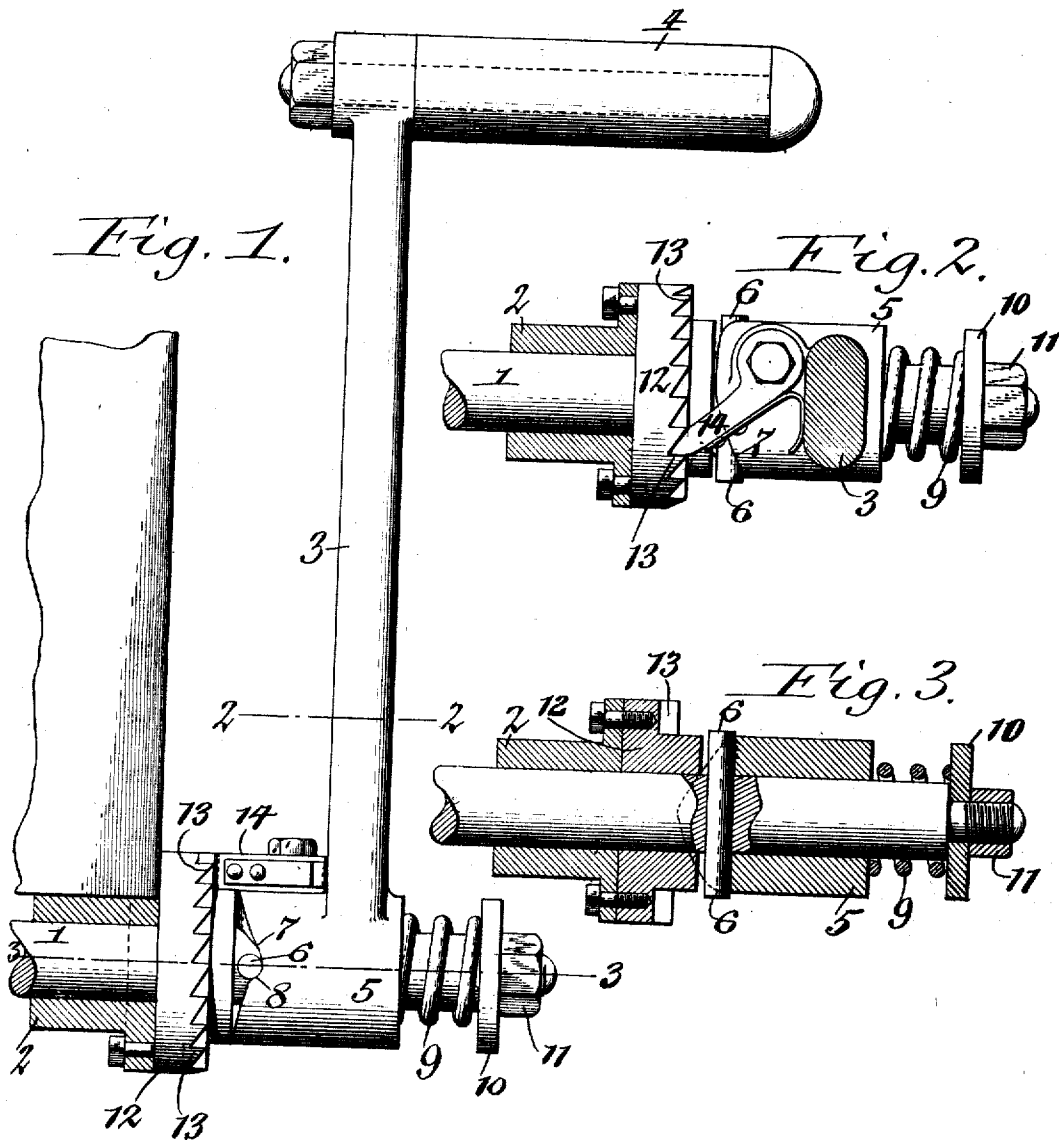


W. VAN SCOTER.
CRANKING DEVICE FOR GAS ENGINES.
APPLICATION FILED FEB. 13, 1911.

1,012,116.

Patented Dec. 19, 1911.
2 SHEETS—SHEET 1.



Witnesses:
Richard Sommer
Alfred Binkhaguer.

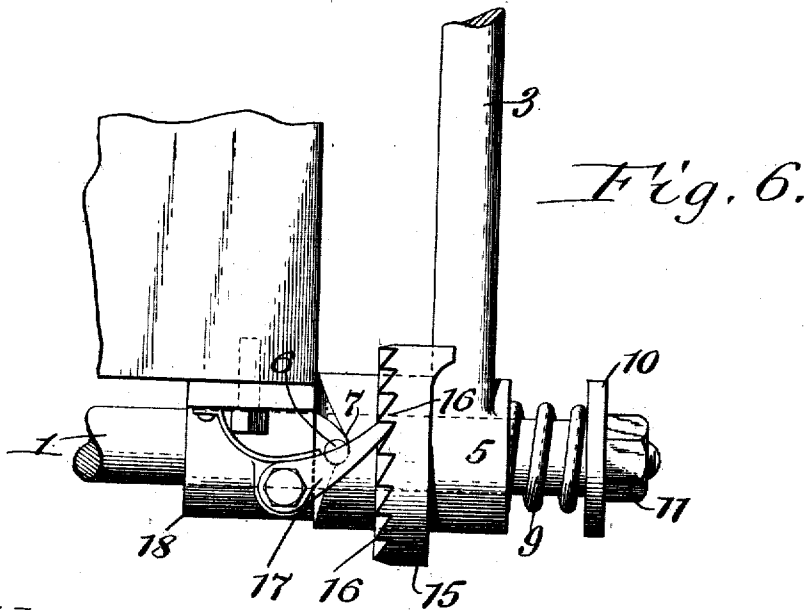
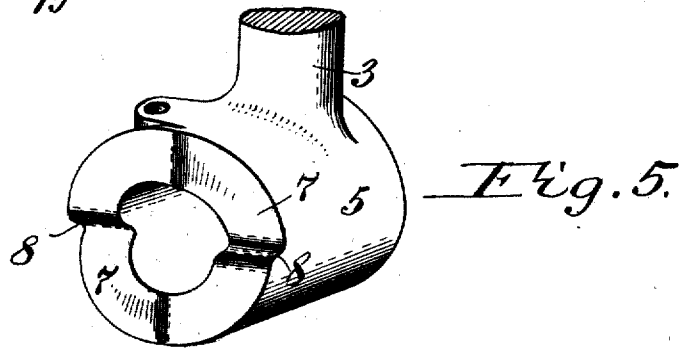
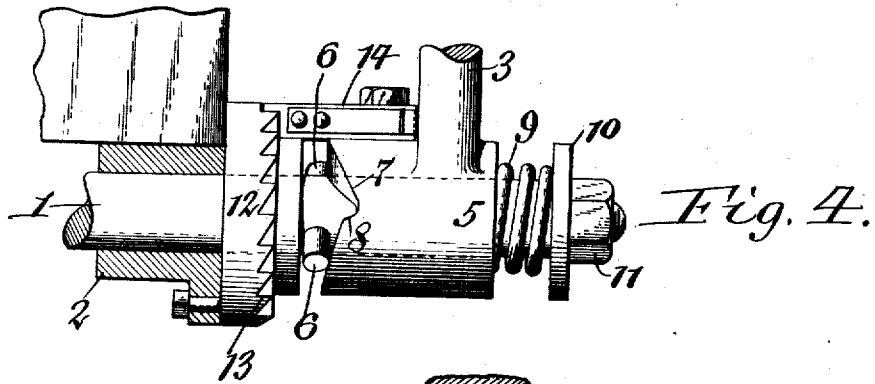
Inventor
William Van Scoter
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Attorneys.

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Witnesses:
Richard Sommer
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UNITED STATES PATENT OFFICE.

WILLIAM VAN SCOTER, OF BUFFALO, NEW YORK, ASSIGNOR OF ONE-FOURTH TO
WILLIAM J. HAYES, OF BUFFALO, NEW YORK.

CRANKING DEVICE FOR GAS-ENGINES.

1,012,116.

Specification of Letters Patent.

Patented Dec. 19, 1911.

Application filed February 13, 1911. Serial No. 608,274.

To all whom it may concern:

Be it known that I, WILLIAM VAN SCOTER, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Cranking Devices for Gas-Engines, of which the following is a specification.

This invention relates to a cranking device for gas engines whereby the same is started manually.

As is well known the cranks of starting devices as heretofore constructed are sometimes turned backwardly very violently by what is known as "back firing" of the engine and this in many cases has resulted in either breaking the limbs or otherwise injuring the operator who is starting the engine by reason of the crank striking the operator during such backward turning movement.

It is the object of this invention to provide an improved cranking device for gas engines which will permit of effectually starting the engine in the ordinary manner but which, during the back fire of the engine, will prevent the starting crank from being turned backwardly and thereby prevent injury to the operator.

In the accompanying drawings consisting of 2 sheets: Figure 1 is a side elevation, partly in section, of my improved cranking device. Figs. 2 and 3 are horizontal sections in the correspondingly numbered lines in Fig. 1. Fig. 4 is a fragmentary side elevation similar to Fig. 1 but showing the crank unlocked from the starting shaft. Fig. 5 is a fragmentary perspective view showing the hub of the starting crank. Fig. 6 is a fragmentary side elevation showing a modification of a starting device embodying my invention.

Similar letters of reference indicate corresponding parts throughout the several views.

1 represents the usual starting shaft of an automobile which is journaled in a bearing 2 mounted on the front part of the frame.

3 represents a crank provided at its outer end with a handle 4 and at its inner end with a tubular hub 5 which is mounted loosely upon the front part of the starting shaft. In rear of the hub of the starting crank the starting shaft is provided with one or more coupling pins 6 which project laterally or radially therefrom, two or such

pins being preferably employed and formed from a single rod which is secured diametrically in the starting shaft so that its outer ends project beyond the periphery of this shaft. At two diametrically opposite places the rear or inner end of the hub of the starting crank is provided with two recesses each of which has an easy sloping or inclined front side 7 arranged at a comparatively small angle relatively to the direction of rotation of the hub and a comparatively abrupt sloping or inclined rear side or shoulder 8 arranged at a greater angle relatively to said direction of rotation than said front side. In the rearmost position of the crank hub each of its recesses receives one of the coupling pins which latter are preferably of cylindrical form. Each of the pins engages one half of its width or nearly so on the trailing side with the abruptly sloping rear shoulder of the coupling recess. The starting hub is yieldingly held in this rearward or inward position so that the same is coupled with the pins of the starting shaft by means of a tension device consisting preferably of a coil spring 9 surrounding the front part of the starting shaft and bearing at its inner end against the starting hub while its outer end bears against a shoulder which is formed on the outer end of the starting shaft by means of a washer 10 secured to the outer end of the starting shaft by a screw nut 11, as best shown in Fig. 3.

The hub of the starting crank is held in engagement with the coupling pins of the starting shaft with sufficient friction by the pressure of the spring 9 that upon turning the crank forwardly and pushing the same inwardly, as is usually done when starting an engine, the crank will be coupled with the starting shaft, as shown in Figs. 1, 2 and 3, and cause the same to turn together and also turn the engine shaft in the same direction for starting the engine. If, however, the engine should kick or turn backwardly, due to back firing in the cylinder or the backward pressure of the coupling pins against the sloping rear shoulders of the coupling recesses on the starting crank hub, the latter will be moved axially forward, as shown in Fig. 4, by the wedging action of the coupling pins against the shoulders 8, thereby causing the driving shaft to be uncoupled from and turned backward independently of the crank, whereby injury to the operator is prevented.

In case the spring 9 should hold the hub of the crank sufficiently firm in engagement with the coupling pins as would tend to turn these parts together in a backward direction there would still be a possibility of the operator's being injured. In order, however, to avoid the backward movement of the crank at all times and render it absolutely impossible for the operator to be injured a ratchet mechanism is provided which is interposed between the crank and an adjacent stationary part of the automobile. In the construction shown in Figs. 1-4, this ratchet or detent device comprises a ratchet disk 12 secured to the bearing 2 and provided with an annular row of teeth 13 each of which has an abrupt front side and an inclined rear side, and a spring pressed pawl or dog 14 pivoted on the hub of the starting crank and engaging with the teeth of the ratchet disk. As the crank is turned forwardly the pawl or dog 14 trips idly over the teeth of the ratchet disk but positively prevents backward movement of the same so that if any backward thrust is exerted by the coupling pins against the coupling shoulders of the starting crank hub the latter is positively pushed forwardly sufficiently to permit the coupling pins to clear this hub and enable the starting shaft to turn backward independently of the crank.

During the ordinary cranking operation the sloping driving shoulder 8 of the hub 5 is pressed by the spring 9 against the rounded pin 6 with sufficient pressure to cause the shaft 1 to turn forwardly with the crank 3. When, however, a back fire occurs the backward rotation of the pin 6 against the sloping driving shoulder 8 causes the hub 5 to be pushed forwardly lengthwise of the shaft 1, at which time the pressure of the spring 9 is overcome, thereby permitting the pin 6 to clear the driving shoulder 8 and enabling the shaft 1 to turn backwardly independently of the crank 3.

The detent pawl 14 is merely employed as an auxiliary safety-device which will positively prevent backward rotation of the crank 3 in case the spring 9 should press the shoulder 8 excessively against the coupling pin 6.

Instead of the ratchet mechanism shown in Figs. 1-4, that shown in Fig. 6 may be employed. This last mentioned ratchet or detent mechanism is practically a reversal of that shown in Fig. 1 and comprises a ratchet disk 15 mounted on the hub of the crank and provided with an annular row of ratchet teeth 16 each of which has an inclined front side and an abrupt rear side, and a spring pressed pawl 17 pivoted on the

bearing 18 of the starting shaft and engaging with the teeth of the ratchet disk 15.

I claim as my invention:

1. A cranking device for gas engines comprising a starting shaft adapted to be connected with the engine shaft and provided with a laterally projecting coupling pin, a crank mounted loosely on the starting shaft and provided with a sloping driving shoulder adapted to engage with said pin, and a spring operating to move said crank axially and hold said shoulder yieldingly in engagement with said pin.

2. A cranking device for gas engines comprising a starting shaft adapted to be connected with the engine shaft and provided with a laterally projecting coupling pin, a crank mounted loosely on the starting shaft and provided with a sloping driving shoulder adapted to engage with said pin, and a spring surrounding the outer end of the starting shaft and bearing at its inner end against the crank and at its outer end against a shoulder on the starting shaft and operating to hold the shoulder of the crank yieldingly in engagement with said pin.

3. A cranking device for gas engines comprising a starting shaft adapted to be connected with the engine shaft and provided with a laterally projecting coupling pin, a crank mounted loosely on the starting shaft and provided with a sloping driving shoulder adapted to engage with said pin, and a ratchet mechanism interposed between said crank and a stationary part and operating to permit forward turning movement of the crank but prevent backward turning movement thereof.

4. A cranking device for gas engines comprising a starting shaft adapted to be connected with the engine shaft and provided with a laterally projecting coupling pin, a crank mounted loosely on the starting shaft and provided with a sloping driving shoulder adapted to engage with said pin, and a ratchet mechanism interposed between said crank and a stationary part and operating to permit forward turning movement of the crank but prevent backward turning movement thereof, said ratchet mechanism comprising a disk mounted on a stationary part and provided with an annular row of ratchet teeth, and a spring pressed pawl pivoted on the hub of the crank and engaging with the ratchet teeth.

Witness my hand this 10th day of February, 1911.

WILLIAM VAN SCOTER.

Witnesses:

THEO. L. POPP,
E. M. GRAHAM.