C. H. NEWTON.

MAKE AND BREAK SPARKING DEVICE.

APPLICATION FILED FEB. 21, 1910.

1,010,448.

Patented Dec. 5, 1911.

4 SHEETS—SHEET 1.

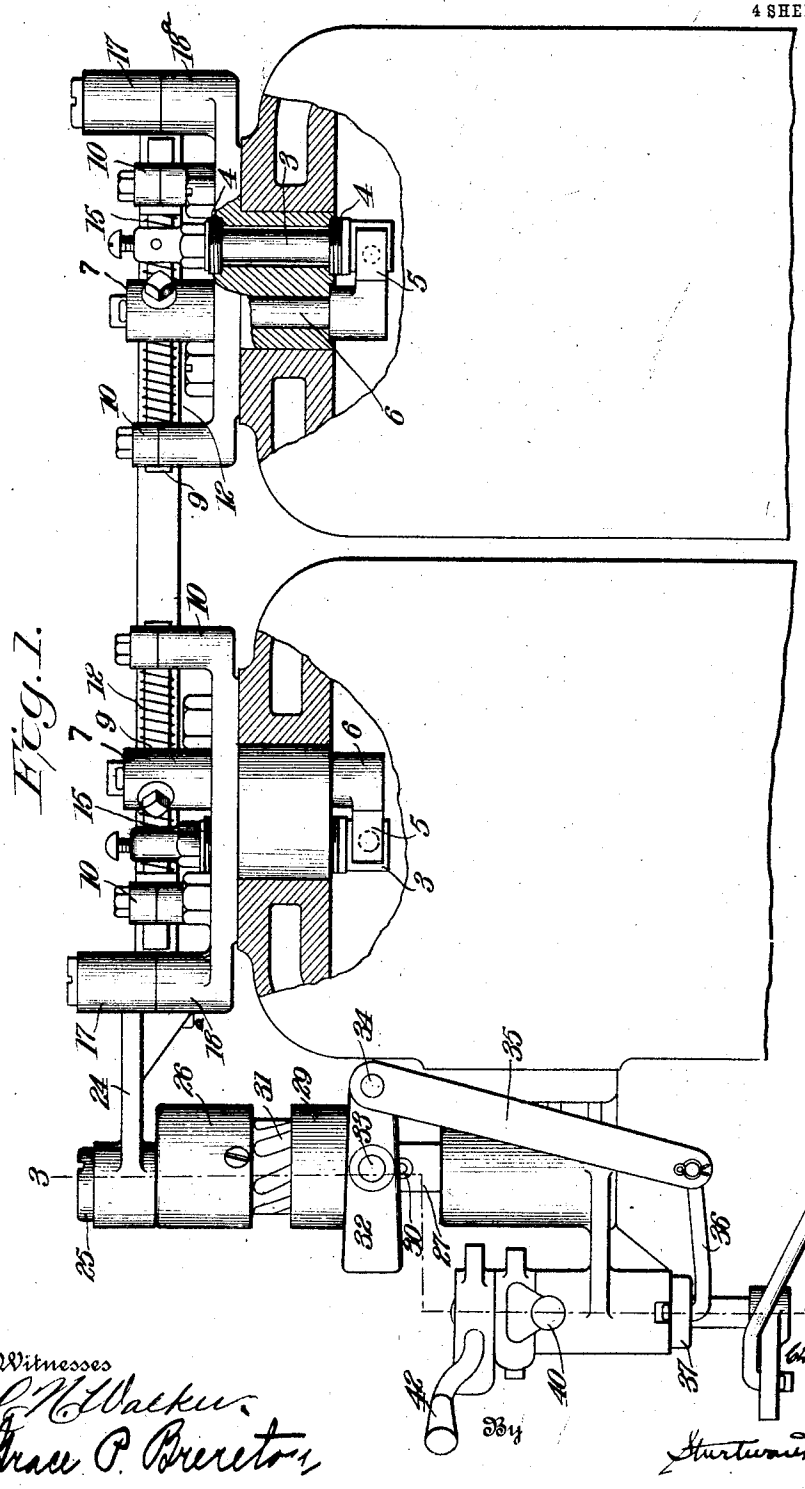

Fig. 1.

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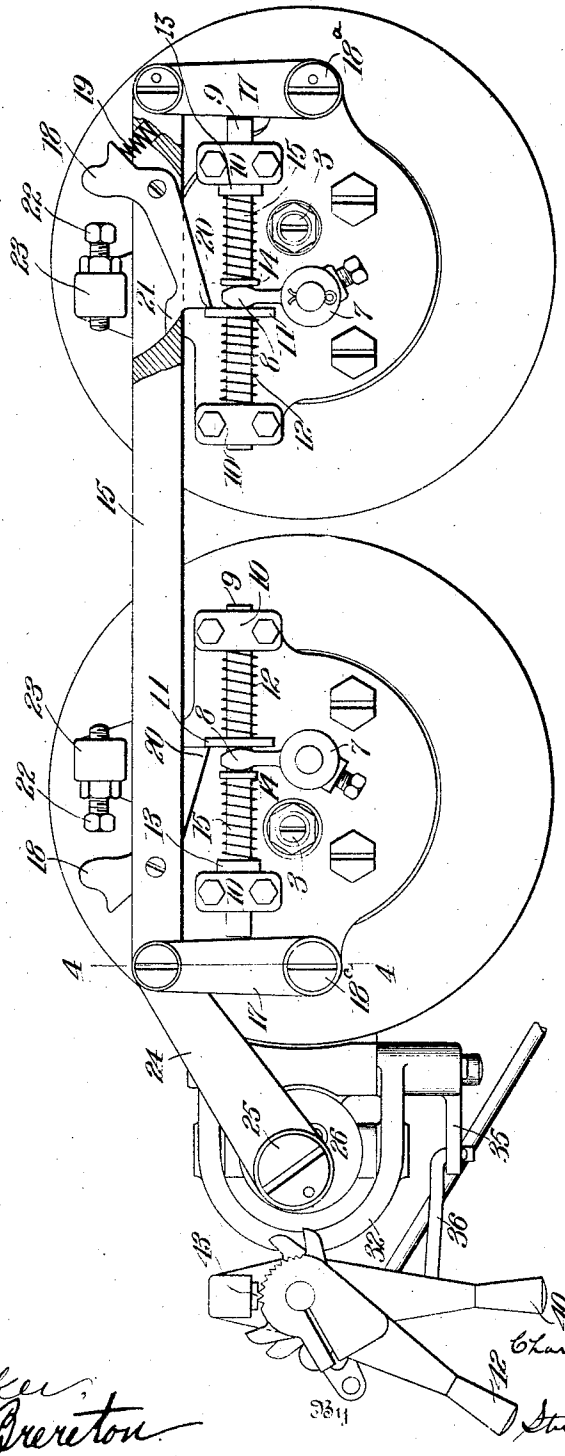

Fig. 2.

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4 SHEETS--SHEET 3.

Fig. 3.

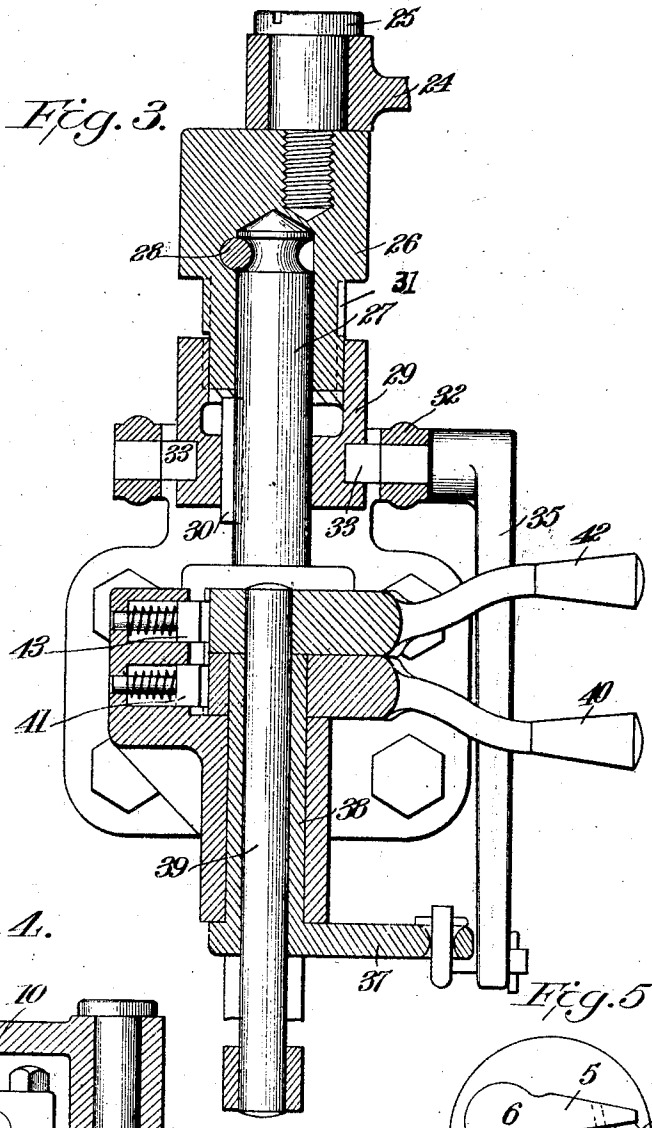


Fig. 4.

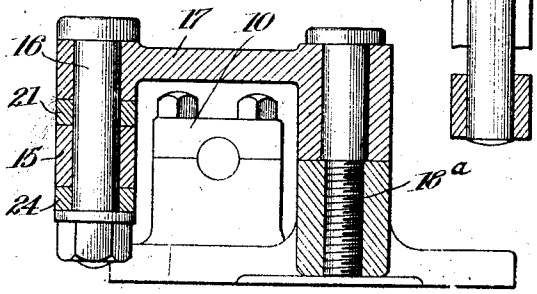
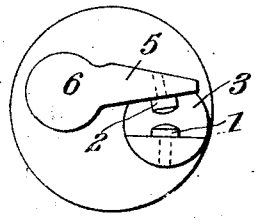


Fig. 5



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4 SHEETS—SHEET 4.

Fig. 6.

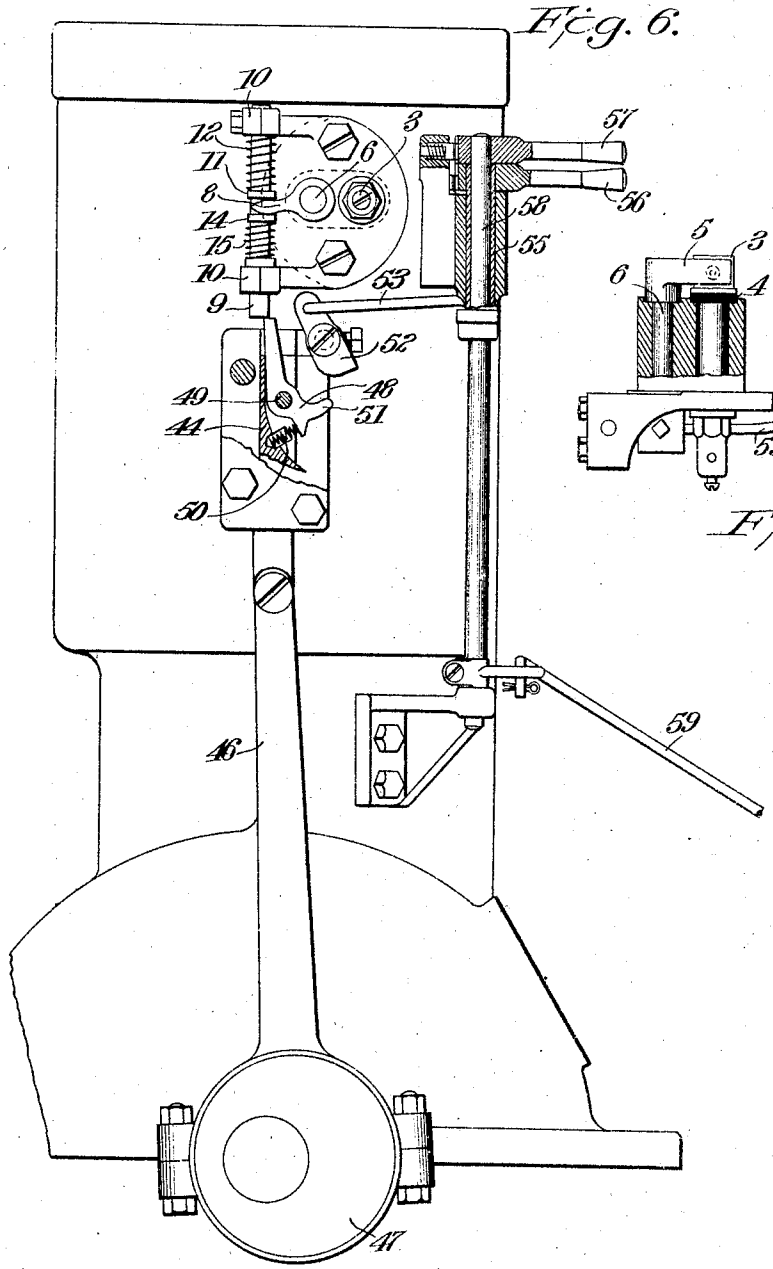
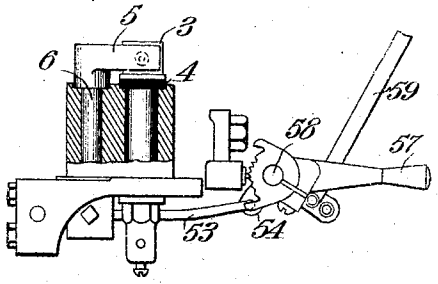


Fig. 7.



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UNITED STATES PATENT OFFICE.

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MAKE-AND-BREAK SPARKING DEVICE.

1,010,448. Specification of Letters Patent. Patented Dec. 5, 1911.

Application filed February 21, 1910. Serial No. 545,190.

To all whom it may concern:

Be it known that I, CHARLES H. NEWTON, a citizen of the United States, residing at Torrington, in the county of Litchfield, State of Connecticut, have invented certain new and useful Improvements in Make-and-Break Sparking Devices, of which the following is a description, reference being had to the accompanying drawing and to the letters and figures of reference marked thereon.

The invention relates to new and useful improvements in make and break sparking devices, and the mechanism for controlling the same.

An object of the invention is to provide a make and break sparking device which is simple and positive in its action, composed of a minimum number of parts so designed that these parts will be durable in construction and subject to the least possible amount of wear, and easy of adjustment and replacement.

A further object of the invention is to provide a make and break sparking device which may be attached either to the side or the end of the cylinder, or which may be attached to a plurality of cylinders, together with mechanism for operating the same which is easily accessible and controllable.

These and other objects will in part be obvious and will in part be hereinafter more fully described.

In the drawings which show by way of illustration one embodiment of the invention:—

Figure 1 is a side view partly in section, showing my sparking device applied to two cylinders and the means for controlling the same. Fig. 2 is a top plan view of the same with the parts in section. Fig. 3 is a sectional view on the line 3, 3, of Fig. 1. Fig. 4 is a sectional view on the line 4, 4, of Fig. 2. Fig. 5 is an end view of the contact carrying members. Fig. 6 is a modification showing in side elevation with parts in section, my make and break sparking device applied to the side of a cylinder and operated directly from an eccentric on the main shaft. Fig. 7 is a detail partly in section of the controlling device for the contacts.

In Figs. 1 to 5 inclusive, I have shown my sparking device as applied to the end of a cylinder in a multiple cylinder machine. It will be understood that the sparking device however, may be attached to a single cylinder or to more than two cylinders and operated in precisely the same manner as shown in these figures, which represent merely an illustrative embodiment of the invention.

My sparking device as herein shown consists of a stationary contact 1 and a movable contact 2. The stationary contact 1, as shown in Figs. 1 and 5, is carried by a stud 3, mounted in insulated bearings 4, 4. The movable contact 2 is carried by an arm 5 mounted on a rock shaft 6. The contacts and their carrying members are identical in each of the cylinders as shown in Figs. 1 and 5 with the exception that the position of the parts are reversed, so that said sparking devices may be operated alternately.

The rock shaft 6 carries an adjustable collar 7 at its upper end, which collar in turn carries a projecting arm 8. A plunger 9 is mounted in brackets 10, so as to reciprocate therein, and carries a fixed collar 11. A spring 12 surrounds the plunger 9 engaging the fixed collar at one end, and one of the brackets 10 at its other end. The spring 12 normally holds the plunger 9 with a second fixed collar 13 in contact with the opposite bracket 10. A collar 14 slides freely on the plunger 9 and is held pressed away from the collar 13 by a spring 15.

The arm 8 is located between the fixed collar 11 and the movable collar 14. It will be readily seen that if the plunger 9 is reciprocated in one direction, the rock shaft 6 in one cylinder will be rocked so as to bring the contacts 1 and 2 together.

Viewing the right hand cylinder in Fig. 2, when the plunger 9 is moved to the left, the contacts are brought together and after the contacts are engaged, the movable collar 14 will yield to allow a further movement of the plunger without destroying the contacts. When however, the plunger is released, the spring 12 will at once throw the arm 8 back to normal position as viewed in Fig. 2, thus making the break and the spark.

As a means for reciprocating the plungers

9, 9, I have provided a bar 15 which is carried by studs 16, mounted in the outer end of arms 17, which are pivoted at 18ª to the casing of the cylinder. The bar 15 carries two operating pawls 18 which are similar, but oppositely disposed. Each of the pawls is pivoted in a recess formed in the bar and is moved by a spring 19 so as to project a shoulder 20 formed on said pawl outward from the bar so that when said bar is reciprocated on the arms 17, said shoulder will engage the fixed collar 11 on the plunger 9. The projecting portion 21 on the pawl engages a wall of the recess in the bar 15 and limits the outward movement of the pawl through the influence of the spring 19. An adjustable bolt 22 is mounted in a bracket 23 and located in the path of the projecting end of the pawl 18. The bar 15 is reciprocated by means of a link 24, which is connected to a crank 25 carried by a collar 26 which is secured to a shaft 27 rotated continuously from the main shaft of the engine. As the shaft 27 rotates, the bar 15 will be reciprocated back and forth. When said bar is moved to the left as viewed in Fig. 2, the shoulder 20 on the right hand pawl will engage the fixed collar 11 and move the plunger 9 on the right hand cylinder, thus bringing the contacts together. By the continued movement of the bar 15, the pawl 18 strikes the bolt 22 and will be turned about its pivot so as to remove the shoulder 20 from contact with the fixed collar 11, and the spring 12 will at once throw the plunger, thus breaking the contact and producing the spark. By adjusting the bolt 22, the time of the release may be varied. During this movement of the bar 15, there is no operation of the sparking device in the left hand cylinder. When the bar 15 is moved in the opposite direction, then the sparking device of the left hand cylinder will be operated in a similar manner and there will be no operation of the sparking device in the right hand cylinder. By varying the relative position of the bolts 22 on either the right or left hand cylinder, the time of sparking in either cylinder may be varied.

In order that the time of sparking may be controlled readily by the operator, I have provided a controlling lever together with mechanism for connecting the controlling lever with the contact operating mechanism, so that the timing of the operation may be adjusted.

The sleeve 26 is mounted freely on the end of the shaft 27, as shown in Fig. 3. Said sleeve is secured against endwise movement on the shaft by a key 28 which engages an annular recess formed in the upper end of the shaft 27. A sleeve 29 is secured to the shaft 27 by a spline 30 so that said sleeve rotates with the shaft 27, but is capable of endwise movement thereon. The collar 26 carries an external spiral thread 31 which engages a corresponding internal spiral thread formed in the sleeve 29.

It will readily be seen that if the sleeve 29 is reciprocated on the shaft 27, longitudinally thereof, the spiral thread connection between the cylinder and the collar 26 will cause said collar 26 to rotate relative to the shaft 27. The sleeve 29 is reciprocated by a yoke 32 which carries pins 33 engaging an annular groove in the sleeve 29. The yoke is pivoted at 34 to the frame of the machine, and carries a crank arm 35 which is connected by a link 36 to an arm 37, formed on a sleeve 38. The sleeve 38 is mounted on a shaft 39. On the upper end of the sleeve 38 is a hand lever 40. When the hand lever 40 is shifted, the sleeve 38 will be rocked and the collar 29 reciprocated, which in turn will rotate the sleeve 26 relative to the shaft 27. The shaft 27 being connected with the main shaft of the engine, will rotate continuously in a certain timed relation with the pistons of the engine. By adjusting the collar 26 relative to the shaft 27, the time of operating the bar 15 relative to the movement of the pistons of the engine, will be varied, and consequently the time of sparking in both cylinders varied.

A locking dog 41 may be provided for holding the controlling lever 40 in different adjusted positions. The shaft 39 carries a hand lever 42 and a holding dog 43 coöperates with the hand lever 42. The hand lever 42 is for the purpose of controlling the throttle, and it will therefore, be seen that I have provided controlling levers which are readily accessible to the operator both for the throttle and the sparking device.

As has already been noted, my controlling device and operating device may be used in connection with a single cylinder instead of two cylinders or in connection with more than two cylinders if desired.

In Figs. 6 and 7, I have shown a make and break device which is similar to that above described, but said make and break device is located in the side of the cylinder, and I have consequently modified to a certain extent the means for operating the same. The plunger 9 is mounted in suitable brackets 10 and carries a fixed collar 11, and a yielding collar 14, and also springs 12 and 15, as above described. The plunger 9 is operated by a sliding bar 44, which is mounted in suitable guides 45 and reciprocated by means of an eccentric strap 46, coöperating with an eccentric 47 on the main shaft of the engine. The pawl 48 is pivoted at 49 to the bar 44, and is held by means of a spring 50, so as to engage the plunger 9 when the bar 44 is reciprocated. A projecting end 51 of the pawl is located so as to engage a tripping cam 52. When the bar 44 is reciprocated, the pawl 48 engages the plunger 9 moving

the contacts into engagement, and when the projecting portion of the pawl engages the tripping cam, the spring 12 will operate to separate the contacts and thus produce the spark. The tripping cam 52 is mounted on a stud, and is adjusted by a link 53, which is connected to an arm 54 carried by a sleeve 55 which at its upper end supports a hand lever 56. The hand lever 57 operates through a shaft 58, and a link 59, a throttle in the manner above described. When the cam 52 is adjusted, the time of tripping the pawl 38 will be varied, and the time of producing the spark also varied.

The operation of my device is as follows: The bar 15 is reciprocated back and forth through the link connection 24 with the shaft 27. As this bar reciprocates, the pawls 18 will operate first one sparking mechanism and then the other. The contact points in each cylinder are normally held separated by the spring 12, and first one sliding member and then the other will be moved by the pawls, so as to bring first the contact points in one cylinder into contact, and then those of the other cylinder. As the sliding member is moved through its connection with the pawl 18, the spring 12 will be compressed, and the fixed collar 13 will, through the spring 15, yieldingly carry the loose collar 14 along with the sliding member 9, and thus rock the arm 8, so as to bring the contact points together. As soon as the contact points are brought together, the spring 15 will yield, allowing the sliding member 9 to have a further movement, thus moving the fixed collar 11 out of contact with the arm 8. When the pawl 18 is tripped, the spring 12 will at once force the sliding member 9 in the opposite direction, causing the fixed collar 11 to strike the arm 8 a blow, separating the contact points. The arm 18 will follow the movement of the fixed collar 11. When the fixed collar 13 strikes the bracket 10, the sliding member 9 will be brought to rest, but the collar 14, which is loose on the sliding member, may continue in its movement, compressing the spring 15, and thus gradually arresting the movement of the arm 8. This results in a cushioning of the movement of the arm 8, which relieves the movable contact from all jar which would in any way disturb or destroy said contact point.

It is obvious that minor changes in the arrangement of parts or the details of construction may be made, without departing from the spirit of my invention as set forth in the appended claims.

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

1. A sparking mechanism including in combination, a stationary contact, a movable contact, means for operating said movable contact comprising an arm connected with said movable contact, a sliding member, a collar fixed on said sliding member and engaging one face of said arm, a spring bearing against said collar for normally holding said contacts separated, a collar loose on said member and engaging the opposite face of said arm, a spring bearing against said collar, means for moving said sliding member for compressing said first named spring and bringing the contacts into engagement, and a stop carried by the sliding member for limiting the movement thereof under the action of said first named spring.

2. A sparking mechanism including in combination, a stationary contact, a movable contact, means for operating said movable contact comprising an arm, a sliding member, brackets in which said sliding member is mounted, a collar fixed to said sliding member and engaging one face of said arm, a spring interposed between said fixed collar and one of said brackets for normally moving said sliding member in one direction, a second collar fixed to said sliding member and engaging the opposite bracket for limiting the movement of said sliding member, a collar movably mounted on said sliding member and engaging the other face of said arm, a spring mounted on said sliding member and interposed between said movable collar and the limiting collar, and means for moving the sliding member in opposition with the first named spring

3. A sparking mechanism including in combination, a stationary contact, a movable contact, means for operating said movable contact comprising an arm, a sliding member, brackets in which said sliding member is mounted, a collar fixed to said sliding member and engaging one face of said arm, a spring interposed between said fixed collar and one of said brackets for normally moving said sliding member in one direction, a second collar fixed to said sliding member and engaging the opposite bracket for limiting the movement of said sliding member, a collar movably mounted on said sliding member and engaging the other face of said arm, a spring mounted on said sliding member and interposed between said movable collar and the limiting collar, a pawl for engaging said sliding member for moving the same in opposition to said first named spring, and means for engaging said pawl for releasing the same from said sliding member.

4. The combination of a plurality of cylinders, a stationary contact and a movable contact carried by each cylinder, a spring for normally holding said contact out of engagement, means for bringing said contacts into engagement and releasing the same, including a sliding member for each sparking mechanism, said sliding members being arranged in a line, a reciprocating bar

parallel with said sliding members, oppositely disposed pawls carried by said bar for engaging and moving first one sliding member and then the other, adjustable tripping members for operating the said pawls for releasing the same from said sliding members, parallel links pivotally connected with the ends of said reciprocating bar, a rotating shaft, a collar mounted on said shaft and carrying a crank pin, and a link connecting said crank pin to said reciprocating bar.

5. The combination of a plurality of cylinders, a stationary contact and a movable contact carried by each cylinder, a spring for normally holding said contact out of engagement, means for bringing said contacts into engagement and releasing the same, including a sliding member for each sparking mechanism, said sliding members being arranged in a line, a reciprocating bar parallel with said sliding members, oppositely disposed pawls carried by said bar for engaging and moving first one sliding member and then the other, adjustable tripping members for operating the said pawls for releasing the same from said sliding members, parallel links pivotally connected with the ends of said reciprocating bar, a rotating shaft, a collar mounted on said shaft and carrying a crank pin, a link connecting said crank pin to said reciprocating bar, and means for adjusting the position of said collar on said shaft, whereby the timing of the movement of the bar may be varied.

6. The combination of a plurality of cylinders, a stationary contact and a movable contact carried by each cylinder, a spring normally holding said contacts out of engagement, means for bringing said contact into engagement and releasing the same, including a sliding member for each cylinder, said sliding members being in line, a reciprocating bar parallel with said sliding members, means for supporting said bar, oppositely disposed pawls carried by said bar for moving first one sliding member and then the other, adjustable tripping members for releasing said pawls from said sliding members, a rotating shaft, a collar carried by said shaft and fixed against endwise movement thereof, an eccentric member carried by said collar, a link for connecting said eccentric member to said reciprocating bar, a sleeve splined to said shaft, a spiral thread connection between said sleeve and said collar, and means under the control of the operator for shifting said sleeve.

7. The combination of a cylinder, a sparking mechanism therefor including a stationary contact, a movable contact, a spring for normally holding said contacts separated, means for bringing said contacts into engagement and releasing the same, including a sliding member, a rotating shaft, an eccentric member carried by said rotating shaft, and connected to said sliding member, means for shifting said eccentric relative to said shaft, for varying the time of sparking, including a sleeve, a hand member connected to said sleeve adjacent one end thereof, a throttle-controlling shaft extending through said sleeve, and a hand lever mounted on said shaft at a point adjacent to said first mentioned hand lever.

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

CHARLES HOLLISTER NEWTON.

Witnesses:
B. S. KEIFER,
G. E. ZIMMERMANN.