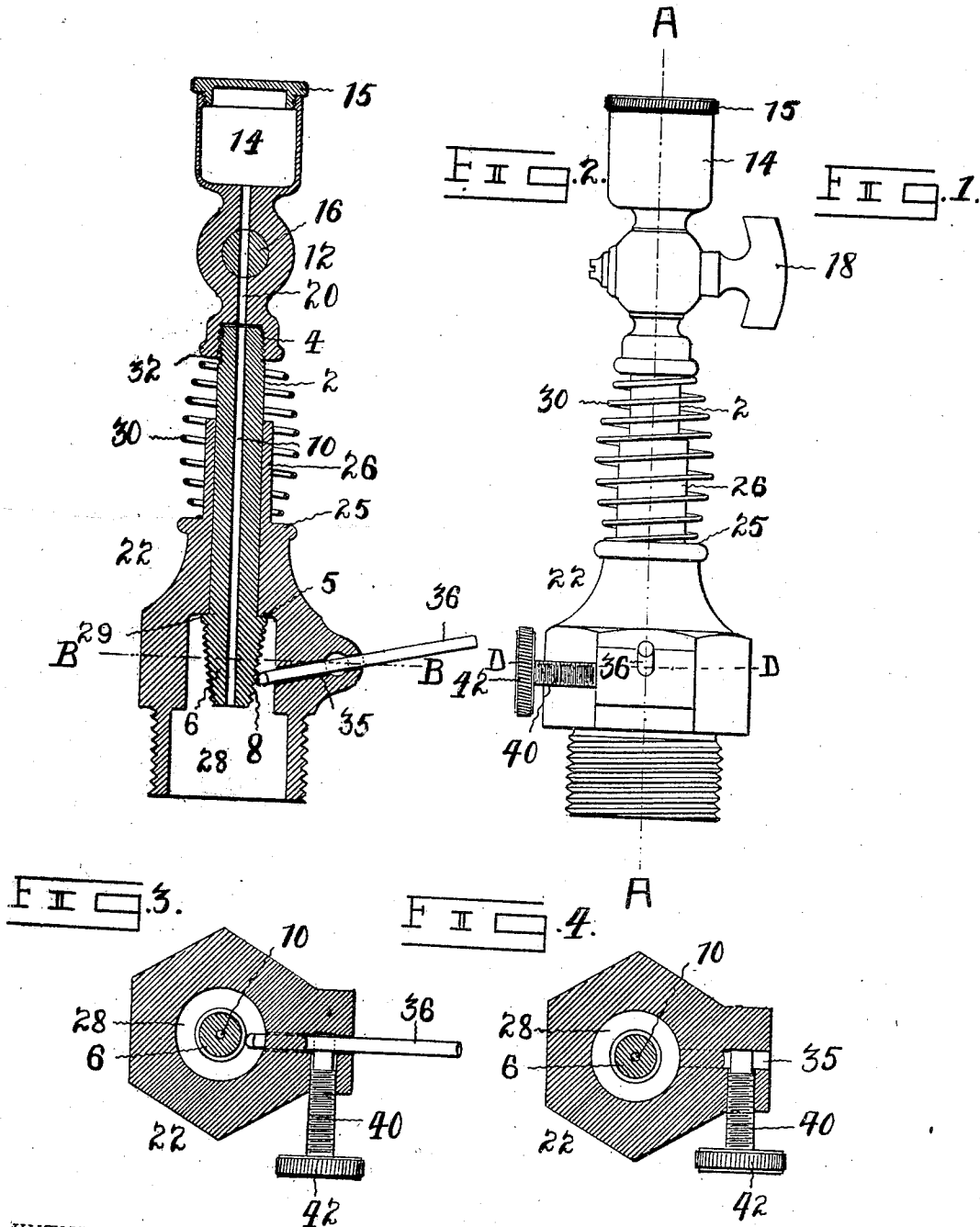


W. W. BONSON & H. L. CLARKE.
MATCH STARTER FOR EXPLOSIVE ENGINES.
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931,726.

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MATCH-STARTER FOR EXPLOSIVE-ENGINES.

931,726.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, WILLIAM W. BONSON and HARLEY L. CLARKE, citizens of the United States, residing, said BONSON, in the city of Dubuque, in the county of Dubuque and State of Iowa, and said CLARKE, in the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Match-Starters for Explosive-Engines, of which the following is a specification.

Our invention relates to match starters for gasoline engines and our object is to provide a combined match starter and priming cup that can be fitted on to any gas, gasoline or other internal combustion engine in such a manner that the charge in the combustion chamber of the engine may be ignited for the first time in starting an engine, without the use of the battery or electric sparker usual for securing the initial explosion in this type of engine.

The manner in which we accomplish the ends sought will be fully described and shown in the following specification, when read in connection with the drawings accompanying the same and forming a part hereof, in which—

Figure 1 is a perspective view of our device. Fig. 2 is a vertical section through the line A—A of Fig. 1. Fig. 3 is a cross section through line B—B of Fig. 2. Fig. 4 is a cross section through line D—D of Fig. 1.

Like characters of reference denote corresponding parts in each of the drawings.

Referring to the drawings, 2 designates a spindle provided with screw threads 4 at the top and a shoulder 5 near the bottom where it is widened out into a valve of truncated cone shape 6 having a roughened or threaded surface 8. Through the spindle is drilled an orifice or hole 10. The threads 4 on the top of the spindle are engaged by corresponding threads on a metal oil cup 12, whereby the cup is rigidly held on the spindle and said cup 12 is provided with an oil chamber 14 having a removable cap or cover 15. In the side of the cup is a stop cock 16 provided with a handle 18. An orifice 20 extends from the oil chamber 14 through the body of the cup and through the stop cock 16 and registers with the ori-

fice 10 in the spindle, whereby it is adapted to take the oil from the oil cup 14 and deliver it into the combustion chamber of the engine below the match hereinafter to be described.

The match starter member 22 is composed of a hollow body provided with a shoulder 25 on the outside and the upper end formed into a neck 26. The hole or opening that extends through the member 22 is, in its upper part, of the size of the body of the spindle 2 but permits said spindle to move therein. The lower end of the member 22 is recessed at 28 forming an opening or chamber considerably larger than the opening in the upper part of the member and this chamber opens out at its bottom into the cylinder or explosion chamber of the engine. The upper portion of the metal surrounding the recess 28 is ground and forms an air tight valve seat 29 for the truncated cone shaped valve 6. Around the spindle 2 and the upper part of the member 22 is coiled a spring 30 which engages at one end the shoulder 25 of the member 22 and at the other end the lower end 32 of the cup 12.

Through one side of the member 22 is drilled a hole 35 considerably above the lower end of the valve 6 for the purposes presently to appear, in which is adapted to be inserted a match 36. For the purpose of holding the match in a given position there is provided an opening in said member 22 at nearly right angles to the hole 35 which opening is screw threaded and in it is screwed a thumb screw 40 having a handle 42, or an ordinary stop cock may be used and operated by a lever. The lower end of the member 22 is screw threaded and adapted to be screwed into the casing of the engine and opens into the combustion chamber.

The mode of assembling and operating our device is substantially as follows: The spindle 2 is inserted upward through the member 22 till the shoulder 5 engages the shoulder or valve seat 29 in the inner side of the recess 28. Then the spring 30 is coiled around the spindle and the member 32 and the cup 12 is screwed on to the screw threads 4 of the spindle 2 somewhat compressing the spring 30. The device, as now assembled, is then screwed into the cylinder or the com-

bustion chamber of the engine with the recess 28 opening out into the combustion chamber of the engine. The chamber 14 of the oil cup 12 is filled with oil and a match 36 is inserted in the hole 35 and forced forward into the chamber 28 and the set screw 40 tightened against the match with the igniting end of the match in contact with the roughened or threaded surface 8 of the truncated cone valve 6. The operator then grasps the handle 18 of the stop cock 16 and turns the cock until it registers with the orifice 20 in the cup 12 and the oil runs down through the hole 10 through the spindle into the chamber 28 below the end of the match and then into the combustion chamber of the engine. If gas be used as the fuel, then the gas is turned on into the recess 28 or combustion chamber of the engine. After sufficient oil has been supplied to the recess 28, the stop cock 16 is closed, thus preventing the escape of any gases through the hole 10. The engine is then brought in the right position and the operator strikes a sharp blow upon the cover 15 of the cup 12, which forces the spindle downward against the spring 30, and brings the roughened surface 8 into engagement with the igniting end of the match and this match explodes the charge inside of the combustion chamber of the engine. Immediately, upon the hand being removed from the cover 15, the spring 30 comes into action and reseats the valve 6 upon the valve seat 29 of the member 22 and prevents the escape of all of the gas from the chamber 28. The burned match 36 is then withdrawn from the opening and the opening is closed by the set screw 40, thus preventing all of the escape of gases through the orifice 35. If for any reason the match should not be ignited, all that is necessary to be done is to simply remove the match and put in another one and strike again upon the cover 15 of the oil cup.

It will be observed that it is simple in construction, is durable, is easily operated, requires no special shape or size match, prevents the escape of all gases, can be attached to any make of engine, the oil being delivered through the orifice 10 below the end of the match there is no chance of the match becoming wet whereby it would "miss fire" or prevent the explosion in the chamber after the match is placed in position and the spring is of such resilient power as to prevent the unseating of the valve and thus admitting air when the engine is taking in a charge, and further is easily and quickly detached from the engine.

Having now described our invention, what we claim is:—

1. In a device of the class described, a match holding member secured to the engine and opening into the combustion chamber of the engine, an opening through said

member in which a match is held, an oil cup secured to the member and having fluid connection with the combustion chamber of the engine, and means operated by the oil cup adapted to engage the ignition end of the match and fire the same to explode the charge in the engine.

2. In a device of the class described, a match holding member adapted to be secured to an engine, an opening into the combustion chamber of the engine, an opening through said member in which a match is inserted, a valve in said member, an oil cup attached to said valve and means upon said valve adapted to engage said match and fire the same to explode the charge in the combustion chamber of the engine.

3. In a device of the class described, a match holding member provided with a valve seat and secured to an engine over the combustion chamber therein, an opening into said member in which a match is inserted, a valve adapted to engage the valve seat in the member and provided with a stem or spindle, an oil cup secured to the spindle of the valve and having fluid communication with the combustion chamber in the engine, and means upon the valve to ignite the match and explode the charge in the engine when a blow is given to the oil cup.

4. In a device of the class described, a hollow match holding member provided with a valve seat therein, secured to an engine and opening into the combustion chamber of the engine, an opening in said chamber for inserting a match therein, a valve in said member provided with a spindle, and adapted to engage the valve seat in said member, an oil cup secured to the spindle of the valve and having fluid connections with the combustion chamber, means on the valve to ignite the match when the valve is unseated, and means for reseating the valve after the match is ignited.

5. In a device of the class described, a match holding member provided with an opening in one side, means for holding a match in said opening and for closing said opening, a valve seat in said member, a valve provided with a stem adapted to engage the valve seat in said member, an oil cup secured to said valve stem and having fluid connection with the combustion chamber through the valve below the match in the opening, a roughened surface on the valve adapted to engage the match and ignite the same when the valve is unseated, and a spring for reseating the valve after igniting the match.

6. In a device of the class described, a match holding member provided with an opening in one side, means for removably securing said member to an explosive engine and opening into the combustion chamber of the engine, means for holding a match in

the opening in said member, a valve in said member provided with a roughened surface, an oil cup connected to said valve, and fluid communication between the oil cup and
5 the combustion chamber through the valve adapted to deliver the fluid into the combustion chamber below the match in said opening.

In testimony whereof we affix our signatures, in presence of two witnesses.

WILLIAM W. BONSON.
HARLEY L. CLARKE.

Witnesses:

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N. W. HAINES.