

F. E. ECKHART.
 STARTING DEVICE FOR INTERNAL COMBUSTION ENGINES.
 APPLICATION FILED JUNE 15, 1910.

1,051,807.

Patented Jan. 28, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

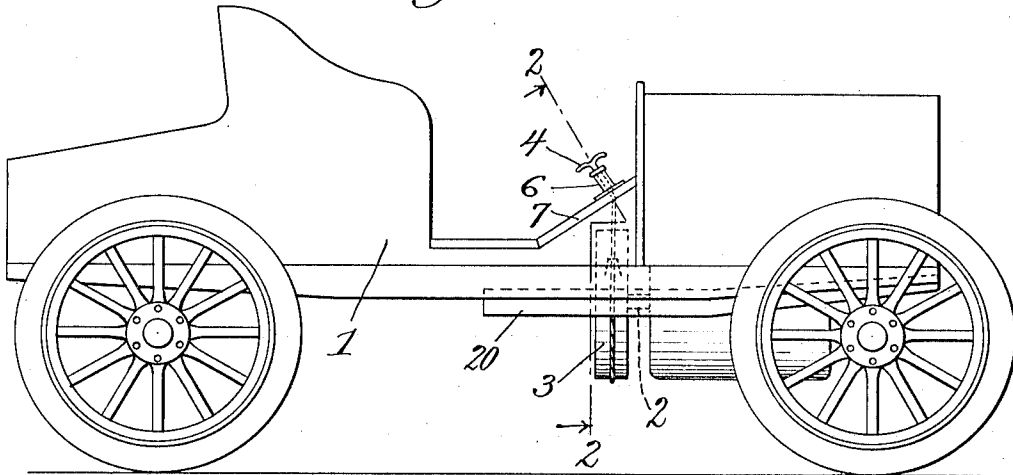
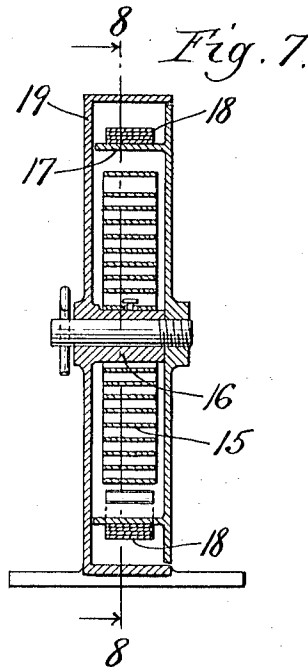
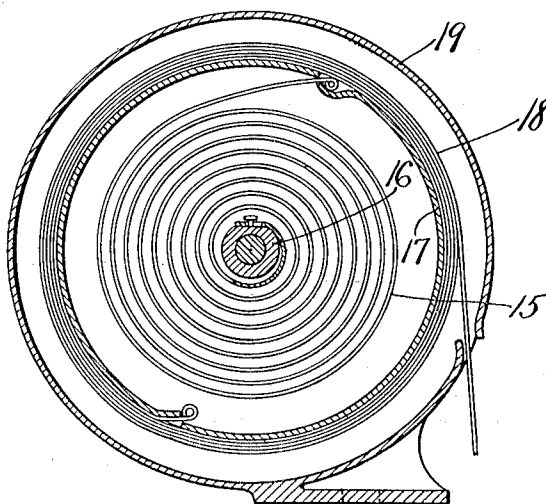


Fig. 8.



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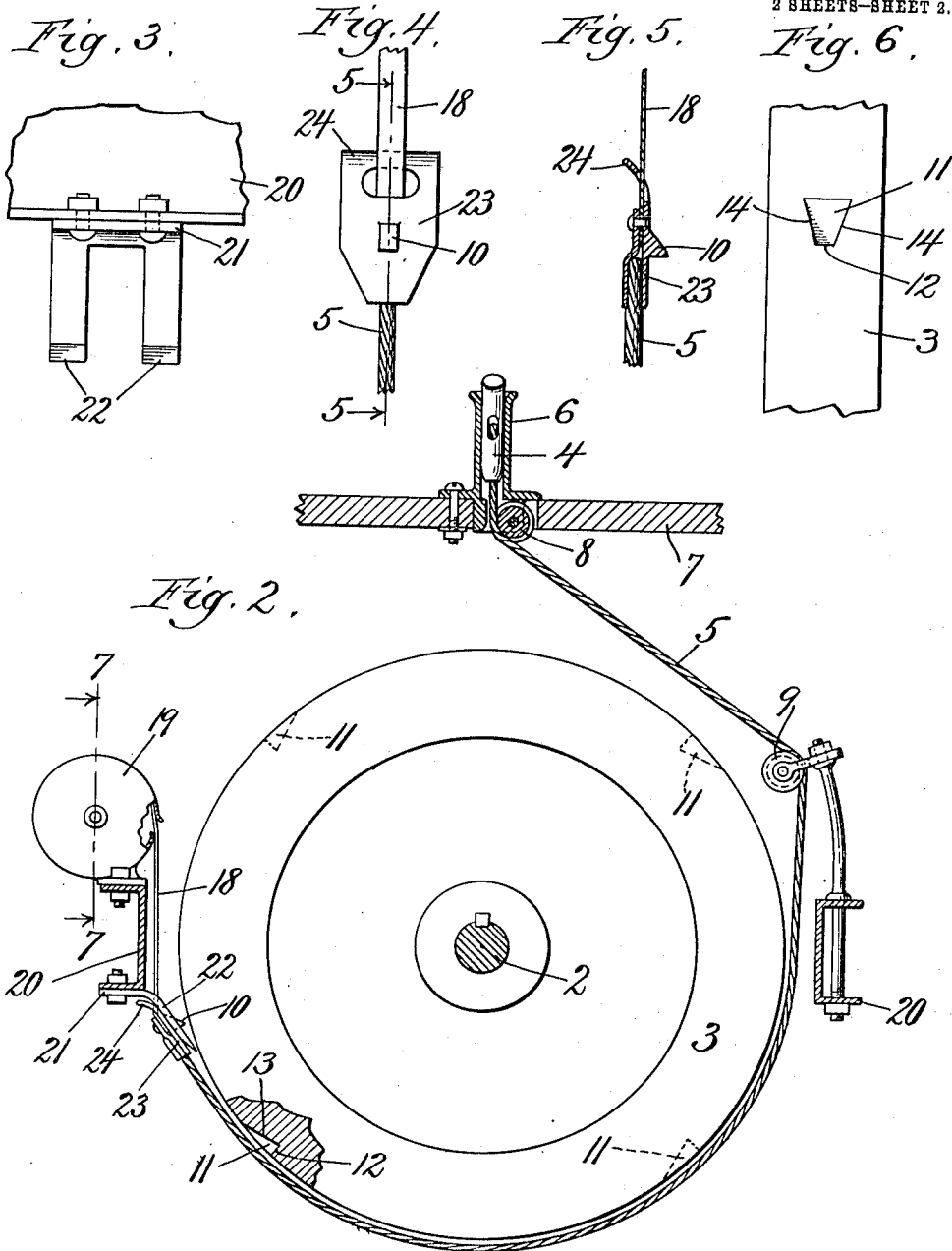
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

FRANK E. ECKHART, OF AUBURN, INDIANA.

STARTING DEVICE FOR INTERNAL-COMBUSTION ENGINES.

1,051,807.

Specification of Letters Patent.

Patented Jan. 28, 1913.

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To all whom it may concern:

Be it known that I, FRANK E. ECKHART, a citizen of the United States, residing at Auburn, in the county of Dekalb and State of Indiana, have invented a certain new and useful Improvement in Starting Devices for Internal-Combustion Engines, of which the following is a specification.

This invention relates to starting devices for internal combustion engines, and has for its object to provide a new and improved device of this description.

The invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a view showing the invention applied to an automobile; Fig. 2 is a sectional view taken on line 2—2 of Fig. 1, with parts omitted; Fig. 3 is a view of the releasing device; Fig. 4 is a view of the engaging part which engages the rim of the fly wheel; Fig. 5 is a sectional view taken on line 5—5 of Fig. 4; Fig. 6 is a view of a portion of the peripheral face of the fly wheel shown in Fig. 2; Fig. 7 is a sectional view taken on line 7—7 of Fig. 2; Fig. 8 is a sectional view taken on line 8—8 of Fig. 7.

Like numerals refer to like parts throughout the several figures.

The object of the present device is to start internal combustion engines, such, for example, as gas engines, and it is particularly adapted to be used in connection with automobiles, and is arranged so that the engine can be easily and quickly started by any one in the automobile without leaving the seat.

Referring now to the drawings, for purposes of illustration I have shown an automobile, 1, provided with an engine of any suitable make, having upon the engine shaft, 2, a fly wheel, 3. Connected with a handle, 4, is a flexible power transmitting device, 5. The handle 4 is located within easy reach of a person sitting in the seat of the automobile, and when not being used may be normally resting in the socket, 6, fastened to the floor, 7, of the automobile. The flexible power transmitting device is preferably guided by suitable pulleys or other friction-reducing devices, 8, 9, and passes around at least a portion of the fly wheel, 3. Connected with the flexible power transmitting device is an engaging part, 10, adapted to engage the fly wheel under predetermined conditions. As herein shown the fly wheel is provided with notches, 11, each having an

engaging face, 12, adapted to be engaged by the engaging part 10. These notches are preferably provided with beveled faces, 13, and beveled sides, 14. One of these notches is shown in Fig. 6, and it will be noted that at the end farthest in the engaging face the notch is the widest, gradually converging toward the engaging face. This construction insures the entrance of the engaging part 10 into the notch so as to insure its engaging the engaging face 12. A series of the notches 11 are arranged about the face of the wheel. These notches are arranged so that when the fly wheel 3 stops rotating, one of the notches will be in proper position to be easily engaged by the engaging part 10, when the handle 4 is pulled. Some means is provided for moving and holding the flexible power transmitting device in its initial position, as shown, for example, in Fig. 2. As herein shown said power transmitting device is connected with an automatic retracting device of any suitable description. As illustrated in Figs. 7 and 8, this automatic retracting device consists of a coil spring, 15, having one end connected to a fixed part, 16, and the other end connected to a rotating part, 17. Connected with the part 17 is a flexible power transmitting piece, 18, adapted to be wound thereabout, and connected with the flexible power transmitting device, 5. If desired the part 18 may be separate from the power transmitting device 5, or it may be a portion of said power transmitting device. The spring 15 and rotating part 17 are preferably mounted in a casing, 19, which is supported in any desired manner. As herein shown this casing is supported upon a part, 20, of the automobile. It will be seen that by this construction the power transmitting device and the engaging device 10 are automatically retracted to their initial position, as shown in Fig. 2, when the handle 4 is released.

Some means is provided for moving and holding the engaging part 10 away from the periphery of the wheel while the engine is running. In Figs. 2 and 3 I have shown such means, comprising a part, 21, having two separated parts, 22, between which the power transmitting piece 18 passes, the ends of the parts 22 being near the periphery of the wheel. The engaging part 10 is preferably connected to a holding piece, 23, which has its end, 24, curved so as to strike

under the parts 22, as shown in Fig. 2, when the handle 4 is released. When the device is in use the parts are normally in the position shown in Fig. 2. When it is desired to start the engine, and the valves, etc. are in proper position for this purpose, the operator in the automobile grasps the handle 4 and pulls upon it. This unwinds the flexible piece 18 and moves the engaging part 10 until it enters one of the notches 11. The further movement of the handle 4 causes said engaging part to engage the face 12 and move the wheel 3 so as to rotate the shaft 2 and start the engine. When the engine starts the wheel moves faster than the engaging part 10 and moves away from it. If the handle 4 is now released, the engaging part will move back to its initial position, as shown in Fig. 2. If, for example, the engine should start backward, so as to move the engaging part 10 toward the part 21, the curved end, 24, will pass under the parts 22 so as to disengage the part 10 from the wheel 3. It will therefore be seen that this device is also a disengaging device, and prevents injury to the parts and to the person starting up the engine. The length of the flexible piece 5 is preferably such that it will hang loose from the wheel 3 when the handle is released, and is also of such length that the hand of the operator will not be pulled into contact with the socket, 6, when the engine starts backward, as above described.

It will be noted that the engaging part which engages the wheel is connected directly to the power transmitting part by which it is actuated, and that when not in actual operation the device is wholly disconnected from the motor or engine, and there are no parts which engage any rotating parts of the mechanism so as to form wearing surfaces. It will further be seen that this device can be applied to any ordinary automobile, and that it can be applied to automobiles of various sizes by simply lengthening or shortening the flexible power transmitting device. It will also be noted that with this device it is impossible for the person who starts the engine to be injured, even though the engine should back fire continuously.

I claim:

1. A starting device for automobiles, comprising a fly wheel provided with a series of notches on its periphery, said notches forming indented engaging faces, an engaging part adapted when moved to engage one of said indented engaging faces on the periphery of the fly wheel and move the engine shaft, a flexible controlling device with which said engaging part is directly connected and having one end within reach of the operator while in the automobile.

2. A starting device for automobiles, com-

prising a fly wheel provided with a series of notches on its periphery, said notches forming indented engaging faces, an engaging part adapted when moved to engage said indented engaging faces on the periphery of the fly wheel and move the engine shaft, a flexible controlling device with which said engaging part is directly connected and having one end within reach of the operator while in the automobile, and a releasing device in proximity to the periphery of the fly wheel, adapted to disconnect the engaging device therefrom when the engine starts in a backward direction.

3. A starting device for automobile engines, comprising an engine shaft, a fly wheel thereon, an indented engaging face on the periphery of the fly wheel, formed by a notch thereon, a projecting engaging part adapted to engage said engaging face, a flexible controlling piece connected with the engaging part and adapted when moved to move said engaging part into said notch to cause it to engage the engaging face on the fly wheel and move said fly wheel and engine shaft.

4. A starting device for automobile engines, comprising an engine shaft, a fly wheel thereon, an indented engaging face on the periphery of the fly wheel, formed by a notch thereon, a projecting engaging part adapted to engage said engaging face, a flexible controlling piece connected with the engaging part and adapted when moved to move said engaging part into said notch to cause it to engage the engaging face on the fly wheel and move said fly wheel and engine shaft, a retracting device associated with said engaging device and adapted to move it out of said notch back to its initial position when the flexible controlling device is released.

5. A starting device for automobile engines, comprising an engine shaft, a fly wheel thereon, an indented engaging face on the periphery of the fly wheel, formed by a notch thereon, a projecting engaging part adapted to engage said engaging face, a flexible controlling piece connected with the engaging part and adapted when moved to move said engaging part into said notch to cause it to engage the engaging face on the fly wheel and move said fly wheel and engine shaft, a retracting device associated with said engaging device and adapted to move it out of said notch back to its initial position when the flexible controlling device is released, and a stop adapted to engage said engaging device when retracted and hold it in proper position with relation to said fly wheel.

6. A starting device for internal combustion engines, comprising a rotatable part connected with the shaft of the engine, a flexible controlling part hung from its ends

and having a loop passing beneath said rotatable part, said loop normally out of engagement with the rotatable part when the device is not in use, a projecting engaging part connected with said loop, an engaging face associated with said rotatable part, and means for bringing said engaging part into

contact with said engaging face, so as to positively connect the loop and the rotatable part.

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Witnesses:

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