

W. G. WESTAWAY.
MIXER FOR INTERNAL COMBUSTION ENGINES OR THE LIKE.
APPLICATION FILED JUNE 30, 1911.

1,031,753.

Patented July 9, 1912.

3 SHEETS—SHEET 1.

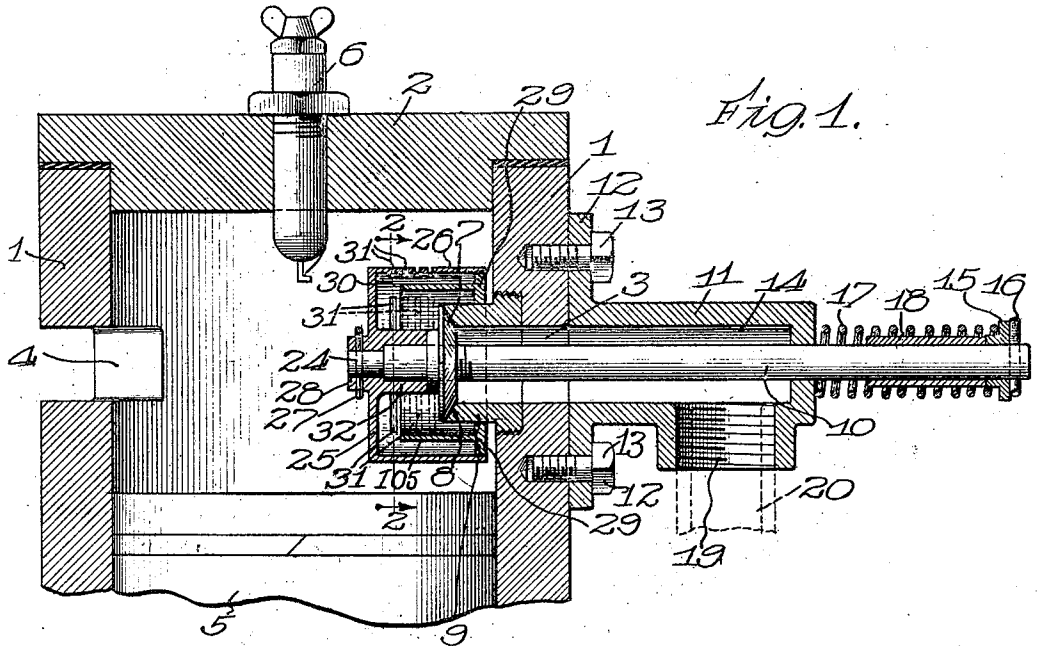


Fig. 2.

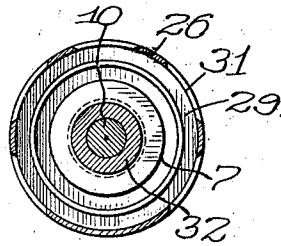
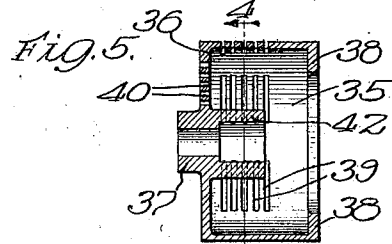
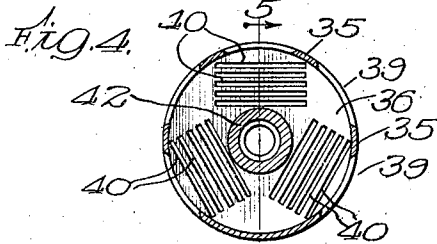
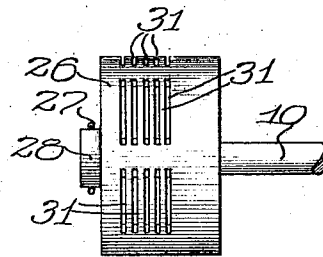


Fig. 3.



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3 SHEETS-SHEET 2.

Fig. 6.

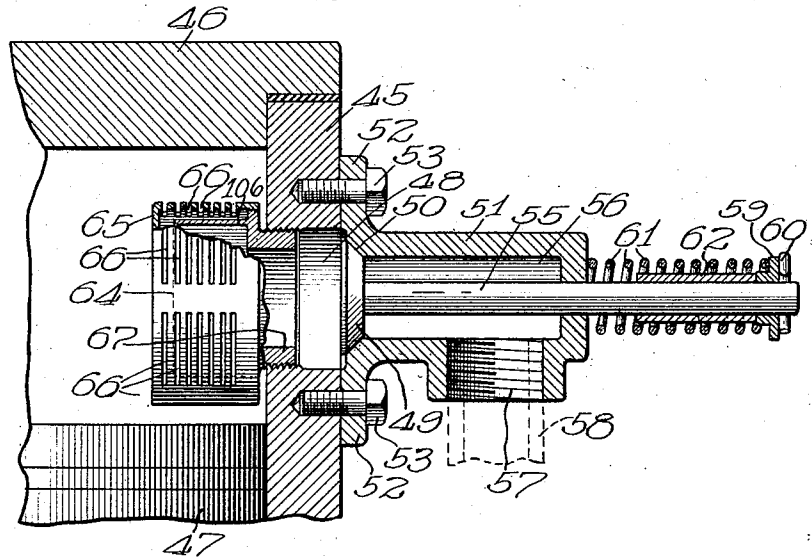


Fig. 7.

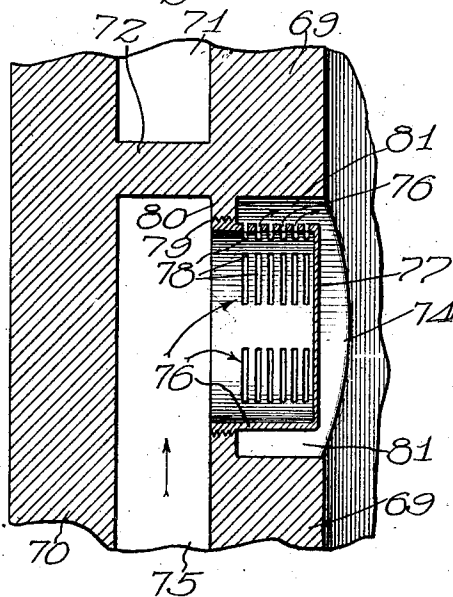
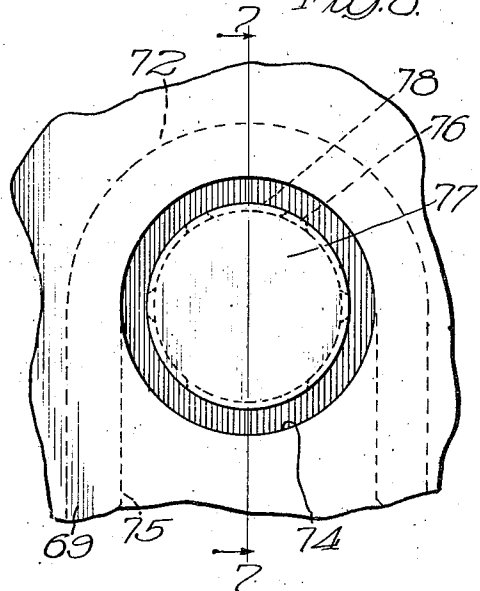


Fig. 8.



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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

WALTER C. WESTAWAY, OF BELVIDERE, ILLINOIS.

MIXER FOR INTERNAL-COMBUSTION ENGINES OR THE LIKE.

1,031,753.

Specification of Letters Patent.

Patented July 9, 1912.

Application filed June 30, 1911. Serial No. 636,315.

To all whom it may concern:

Be it known that I, WALTER C. WESTAWAY, a citizen of the United States, residing at Belvidere, in the county of Boone and State of Illinois, have invented certain new and useful Improvements in Mixers for Internal-Combustion Engines or the Like.

My invention belongs to that general class of devices known as mixers or the like, for mixing or co-mingling the charge of fuel supply for internal combustion engines, and relates particularly to an auxiliary mixer adapted to be placed within the engine cylinder, or in close proximity to the intake port, to completely or finally co-mingle or mix the ingoing charge or mixture. It is preferably used in connection with the usual form of carbureter or mixer to further mix or complete the mixing, but I do not wish to be understood as limiting myself to the use of a carbureter, or any particular type of apparatus for that purpose, or to an engine so equipped.

My invention has among its objects the production of a mixer that is simple, efficient, durable and satisfactory, that may be economically manufactured and installed, that is adapted for any type of engine, and not confined to any particular kind of fuel, but may be used wherever found applicable.

To this end my invention consists in the novel construction, arrangement and combination of parts herein shown and described, and more particularly pointed out in the claims.

In the drawings, wherein like reference characters indicate like or corresponding parts, Figure 1 is a sectional view of a portion of an engine cylinder and a sectional view of my device applied to the intake port thereof. Fig. 2 is a sectional view of the mixer taken substantially on line 2, 2 of Fig. 1. Fig. 3 is a side elevation of the same. Fig. 4 is a sectional view of a slightly different form of mixer taken substantially on line 4, 4 of Fig. 5. Fig. 5 is a sectional view of the same taken substantially on line 5, 5 of Fig. 4. Fig. 6 is a sectional view of a portion of an engine, showing a slightly different form of mixer. Fig. 7 is a sectional view of an engine cylinder taken on line 7, 7 of Fig. 8, showing another form

of mixer. Fig. 8 is a view in elevation of the same. Fig. 9 is a sectional view of a portion of an engine, taken substantially on line 9, 9 of Fig. 10, showing a modified form of mixer. Fig. 10 is a sectional view of the same taken substantially on line 10, 10 of Fig. 9, and Fig. 11 is a side elevation of the mixer removed from the cylinder.

Referring to the drawings, and particularly Figs. 1, 2 and 3, 1 represents the walls of the engine cylinder, 2 the cylinder head, 3 the intake port, 4 the exhaust port and 5 the piston. Any suitable form of ignition means may be provided, the same being represented by a spark plug 6. A four-cycle type of engine is illustrated in Fig. 1, the intake port being controlled by a valve 7 arranged to seat on a suitable valve seat 8 formed in the part 9, which may be made integral with the cylinder walls if desired. The valve in the exhaust port is not shown. The valve 7 is provided with a stem 10, which extends through a casing 11 secured to the engine cylinder by bolts 13 passing through the flange 12 and engaging the cylinder walls. The casing 11 is provided with a chamber 14 therein and with an inlet 19, through which the mixture or charge is admitted from a pipe 20, or its equivalent, from the carbureter or other mixing means. The valve is normally maintained on its seat by a resilient member 17 engaging the casing 11, and a collar 15, which is secured on the stem 10 by a pin 16. If desired, a collar 18 may be provided for limiting the movement of the valve 7 in opening. The valve mechanism, casing therefor, etc., just described, may be of any preferred form and modified as desired, that shown being merely for illustration.

Arranged within the cylinder, as shown, on the extended end 24 of the valve stem 10, or otherwise suitably secured to the valve 7, is a shell comprising sides 26 and end 25, the same being shown secured on the stem by a pin 27 passing through the extended end 28 of the end 25 of the casing and the end 24 of the valve stem. The shell may also be extended on the interior as at 32, if desired. The shell is also preferably flanged or provided with an end as at 29 so as to contact with the exterior of the part 9,

so that the shell is substantially closed at its ends. Through the walls of the shell are provided a plurality of openings 31, the same being preferably in the form of narrow circumferential extending slots, or apertures. Where the mixer is arranged in substantially the position shown, the slots in the under side may be omitted so as to collect any particles of hydro-carbon. Preferably arranged within the shell is a spreader or distributor 105.

The operation of the device is substantially as follows: As the valve 7 is opened, either mechanically or by the suction of the engine, to take in a fresh charge, the mixture passes through the chamber 14 in the casing 11 and past the valve between its face and the seat 8, and into the chamber 30 in the mixer; thence about the spreader or distributor 105 and out through the openings 31 to the interior of the cylinder, where it is compressed, fired, and the products of combustion discharged in the usual manner. As the charge passes through the slots 31 it is further broken up and mixed or commingled, greatly improving the mixture. As previously mentioned, the mixture is preferably passed through a carbureter (not shown) before its passage from the pipe 20 into the casing chamber 14, but I do not wish to be understood as limiting myself to a carbureter or other mixing means. In the case of some kinds of mixtures, where a certain amount of pre-heating before firing improves the charge, it will be readily seen that the same is efficiently pre-heated while in the chamber 30 in the mixer, which is warm or hot from the explosions in the cylinder. With this construction the mixer moves back and forth with the valve, the one outlet from the shell being through the opening 31.

A substantially similar form of mixer is shown in Figs. 4 and 5, in which 35 represents the shell provided with end 36 and flange 38, and extended as at 37 and 42, similar to the other mixer described. This form of mixer, however, in addition to having openings 39 in the sides or wall of the mixer, similar to the openings 31 in the form described, is provided with a plurality of openings, which are preferably in the form of slots 40 in the end 36. The operation of the same is substantially the same as the mixer described.

In Fig. 6 is illustrated a slightly different form of mixer, applicable for use where the intake valve is arranged to seat in a suitable casing on the cylinder. Referring to the figure, 45 represents the cylinder wall, 46 the cylinder head, 47 the piston and 48 the intake port, the exhaust port, ignition mechanism, etc., being omitted. In this case the casing 51 is provided with a valve seat

50, upon which the valve 49 seats. It is, of course, understood that the casing 51 may extend as far through the port 48 as may be desired, and the valve seat consequently be as shown, or farther in the intake port. The valve 49 is provided with the stem 55 and with the resilient member 61, cap 59, pin 60 and stop 62 similar to the construction previously described. The casing 51 is provided with a chamber 56 having an inlet 57, through which the incoming mixture is admitted from the pipe 58. The operation of the valve is heretofore described, that is it may be operated mechanically or by the suction of the engine. In this case, however, the mixer does not move with the valve. The mixer comprises a shell 64 having an end 65, the walls being provided with openings 66, which are preferably as shown. Openings may be provided in the end 65 similar to the openings in the mixer shown in Figs. 4 and 5, if desired. In this case the mixer end is flanged as at 67 and threaded to engage the cylinder wall, and preferably provided with a spreader 106. Any equivalent means for securing it in position, however, may be employed, as for example, to the casing 51 when extended as before mentioned. The mixture is further mixed or commingled with this form in a similar manner to that described heretofore in reference to the construction shown in Fig. 1.

Figs. 7 and 8 illustrate the application of the mixer to a two-cycle engine, the same, however, being merely to illustrate its application, as the mixer is substantially similar to that shown in Fig. 6. Referring to these figures, 69 represents the cylinder wall provided with a water jacket wall 70, 71 represents the space for the cooling water. In this form 75 is the intake passage, separated from the water jacket by a partition 72, 74 being the intake port. The mixer comprises a shell 76 having an end 77 and provided with openings 78 through which the mixture passes. The mixer may be secured in position in any desired way. As shown, it is threaded at 79 and arranged to engage the extended portion 80 in the cylinder wall, there being a space 81 between the sides of the shell and the wall of the intake port. In operation the mixture or charge passes from the intake passage 75 to the interior of the shell, and thence through the openings 78, through the spaces 81 and through the intake port to the interior of the cylinder. The mixture is improved as heretofore described, there being a slight heating of the mixture as mentioned. A spreader similar to those previously described may be employed if desired.

The form shown in Figs. 9, 10 and 11 is somewhat different in construction, but the action or result is substantially similar, the

charge being further mixed after being conducted to the cylinder. In these figures 84 represents the engine cylinder provided with the usual head 85, piston 86, intake port 87 and exhaust port 88. The valves controlling the intake and exhaust are not illustrated, as they may be of any desired form, or substantially similar to the intake valve herein described. Arranged within the cylinder, preferably proximate the head, is a transverse partition or part 89, the same being arranged to screw in the end, or to be otherwise secured in position. The part 89 is extended as at 90, the same forming a ring and is of sufficient height to fit tight against the cylinder head 85 when the same is positioned. The part 90 is provided with openings 91 on the side at the intake port 87, 92 being a support or brace, which may be provided if desired. Arranged on the interior of the part 89 and its extension 90, is a part 93, the same being shown as arranged to engage the part 90 and be supported thereby. The part 93 is extended as at 94, the parts 89—90 and 93—94 being formed with a chamber 96 therebetween, which chamber is connected to the interior of the cylinder by a passage 95 formed about the parts by the space between the parts 89 and 94. The flanged part 89 is preferably provided with one or more exhaust openings 97, therethrough, 101, 101 being extended parts, which shut off a portion of the space above the part 89 between the intake and the exhaust. The part 93 is preferably opened as at 98, so that the spark plug 99, or its equivalent, may be inserted into the cylinder, the preferred arrangement of the same being so that it does not extend quite to or below the lower edge of the mixing device. The operation of this form of mixer is as follows: The mixture is admitted through the intake port 87 and passes through the openings 91 into the chamber 96, whence it is discharged through the opening 95 into the cylinder and fired in the usual manner. The exhaust passes through the openings 97 and out through the exhaust port 88. As before mentioned, suitable valves at the intake and exhaust may be provided.

It will be seen that the operation of all the mixers described are substantially the same, the mixture being further mixed or co-mingled at the time or after it passes into the cylinder, the result being that a more efficient mixture and charge is in the cylinder when fired, giving a more efficient engine. The styles of the engines, valves, etc., as shown in the drawings, are as before mentioned, merely for the purpose of illustration.

Having thus described my invention, it is obvious that various immaterial modifi-

cations may be made in the same without departing from the spirit of my invention, hence I do not wish to be understood as limiting myself to the exact construction, arrangement or combination of parts herein shown and described, or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:—

1. An auxiliary mixer for internal combustion engines, consisting of a shell closed at one end and provided with a plurality of openings through the walls thereof, a spreader in said shell and means for securing said mixer at the intake port of the engine in the path of the ingoing mixture.

2. A mixer for combustion engines, comprising a shell closed at one end and provided with a plurality of openings through the walls thereof, a spreader in said shell and means for securing said mixer at the intake port of the engine with the open end at said port, whereby the ingoing charge is admitted into the cylinder through said openings.

3. In an internal combustion engine, a cylinder provided with an intake port, a valve arranged to control said port and a mixer carried by said valve.

4. In an internal combustion engine, a cylinder provided with an intake port, a valve arranged to control said port and a mixer carried by said valve, said mixer consisting of a shell provided with a plurality of openings through the walls thereof.

5. In an internal combustion engine, a cylinder provided with an intake port, a valve arranged to control said port and a mixer carried by said valve, said mixer consisting of a shell provided with a plurality of openings through the wall thereof, and a spreader in said shell.

6. The combination in an internal combustion engine, of a cylinder including a head and provided with an intake port and an exhaust port, and a mixer arranged within said cylinder, said mixer comprising an annular part arranged transversely the cylinder with the intake and exhaust ports between said part and the head, said part being provided with a chamber therein open to said intake port and to the interior of the cylinder, and with a partition between the ports.

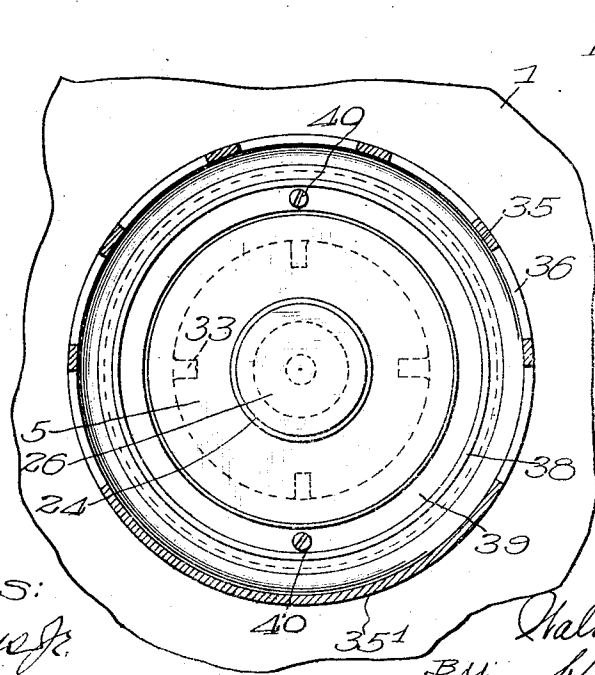
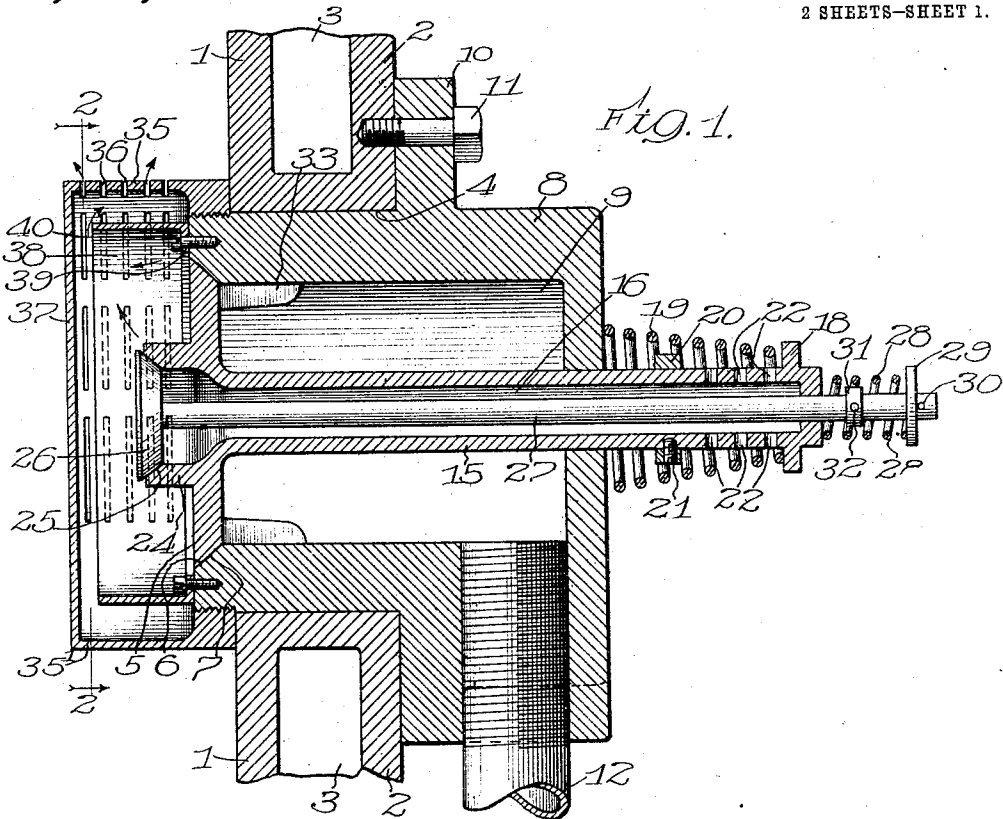
7. In a device of the kind described, a cylinder provided with a head and with an intake port and an exhaust port, in combination with mixing means arranged between said intake port and the explosion chamber, said mixer comprising a transverse partition arranged within the cylinder with said ports between said partition and the head, said partition provided with a part interposed between said ports, a co-operating part arranged within said parti-

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2 SHEETS—SHEET 1.



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