N. P. MADER.

MIXER.

APPLICATION FILED FEB. 7, 1910.

973,057. Patented Oct. 18, 1910

Fig. 1.

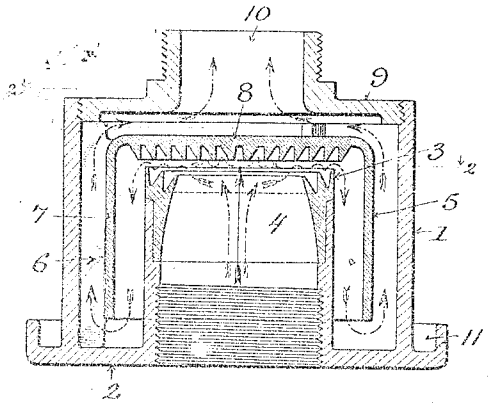


Fig. 2.

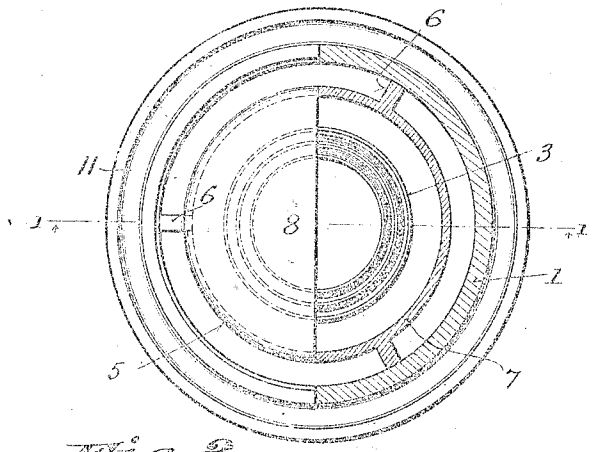
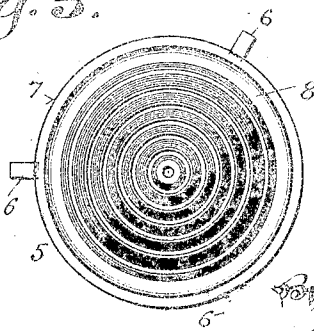


Fig. 3.



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UNITED STATES PATENT OFFICE.

NICHOLAS P. MADER, OF SUN PRAIRIE, WISCONSIN.

MIXER.

973,057. Specification of Letters Patent. Patented Oct. 18, 1910.

Application filed February 7, 1910. Serial No. 542,559.

To all whom it may concern:

Be it known that I, NICHOLAS P. MADER, a citizen of the United States, and resident of Sun Prairie, in the county of Dane and State of Wisconsin, have invented certain new and useful Improvements in Mixers; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention has for its object to provide a simple, effective and economical mixer or homogenizer, the construction and arrangement being such that air and oil admitted to the mixing chamber are thoroughly mingled before being delivered into the combustion chamber, the uniform mixture of the air and oil to form the explosive gas being attained by passing the same through a series of chambers successively reduced in area, whereby a slight gradual compression of the carbureted vapor is obtained up to a point of discharge, at which point said vapor is expanded.

A further efficient result is obtained by utilizing serrated or corrugated surfaces, over which the oil and air pass whereby a thin film of oil will, by capillary attraction, adhere to said surface and permit the air to have access thereto, thus thoroughly breaking up and evaporating any particles of oil which may be discharged into the mixing chamber.

With the above objects in view, the invention consists in certain peculiarities of construction and combination of parts as fully set forth hereinafter with reference to the accompanying drawings and subsequently claimed.

In the drawings Figure 1 represents a sectional elevation of a carbureter mixing chamber embodying the features of my invention, the section being indicated by line 1—1 of Fig. 2; Fig. 2, a plan view of the same partly in section as indicated by line 2—2 of Fig. 1, and Fig. 3, a detail inverted plan view of one of the mixing chamber members detached, illustrating an annular corrugated head against which the oil and air are deflected.

Referring by characters to the drawings 1 represents the exterior wall of a chambered casing provided with a bottom head 2 having a centrally disposed intake nozzle extending therefrom, which nozzle projects into the casing. The mouth of the nozzle is provided with a series of annular corrugations 3, which corrugations in this instance are formed upon a thimble 4 that is secured in any suitable manner within the end of said nozzle. These corrugations are formed in the upper edge of the thimble with their top edges successively increasing in height to the outer series, the depth of the grooves between the first and second corrugations being greater than the depth of the next groove, which, in this instance, completes the series.

A dome 5 is fitted within the chamber of the casing, being preferably a detachable part as shown. The said dome is supported by means of radially disposed ribs 6 which engage the inner faces of the casing 1 and rest upon the bottom head 2. The side-walls 7 of the dome are so spaced relative to the adjacent face of the nozzle and casing as to form channels therebetween, the channel between the dome side-walls and nozzle, being of slightly greater width than the channel between said side-walls of the dome and the casing-wall 1. The bottom edge of the side-walls of said dome terminates at a distance from the bottom head, which distance is equal to the width of the inner channel that is formed between the dome and nozzle. The head 8 of the dome serves as a deflector, against which the air and oil come in contact as it is delivered from the intake nozzle.

As clearly shown, the inner face of the dome-head is provided with a series of concentric circular corrugations, the crowns of which corrugations terminate just above the crown of the outer corrugation of the series with which the nozzle is provided. It will also be observed that these two sets of corrugations are relatively disposed in such manner that the corrugations of the nozzle articulate with those corrugations of the dome-head located above the same.

The casing 1 is open at its upper end and provided with screw-threads for the reception of the threaded edge of a cap 9, which cap is provided with a discharge aperture 10 in the form of a threaded nipple adapted to receive the usual pipe connection, the intake nozzle being internally threaded for the reception of the usual inlet pipe connection, through which pipe connection oil and air are delivered to the mixing chamber. The bottom head of the casing 1 is provided with an annular exterior groove 11 adapted to receive a small quantity of oil for the purpose of warming the mixing chamber

under certain conditions, the oil being ignited increases the temperature of said chamber, and while I have made provision for this purpose, it is understood that in some instances the annular groove may be dispensed with. As shown, the thimble 4 is constructed from a separate piece of metal and fitted within the nozzle. This construction is employed for convenience in manufacture, but it should be understood that in some instances the corrugated edge may form an integral part of the intake nozzle.

As indicated by the arrows in Fig. 1, the volume of air and oil when sucked up through the intake nozzle will strike the corrugated surface of the dome head and these corrugations will thus break the oil into a fine spray. As the air is deflected radially it will cause the oil to travel in the same direction across the series of corrugations, being confined thereto by capillary attraction. This thin film of oil distributed over the large surface area thus formed causes the air being passed thereover to become fully laden or enriched with the oil vapor, while at the same time the interrupted surface prevents any of the liquid from being carried farther into the mixing chamber or delivered into the engine.

Should the corrugated head become overladen with oil at its outer edges, the same of its own weight will drop and be caught into the grooves of the lower corrugations and thus being pocketed will be gradually absorbed by air passing thereover, and owing to the articulated position of the corrugations as stated previously, it will be seen that the air when passing therebetween will thus be deflected in somewhat zigzag form and thereby insure the opposing oil laden surfaces being thoroughly subjected to an air bath. The gaseous fluid in its travel from the intake nozzle will be slightly and gradually compressed as it passes between the corrugated faces. The carbureted air thereafter passes down the channel between the dome and nozzle and is again slightly compressed. At the bottom edge of the dome the air is returned up through the outer channel between the dome-wall 7 and chamber-wall 1. At this point another slight compression takes place until the said air is discharged above the dome into a mixing compartment, which is of such area as to permit the vapor to extend the full capacity of the discharge opening.

By utilizing a succession of channels as stated, in which channels the carbureted vapor passes in a zigzag form under a succession of step-by-step compressions, it will be understood that the air is thoroughly mixed with the oil vapor, and after being thoroughly mixed is discharged into the combustion chamber of the engine in a gas of uniform richness. Thus, by utilizing a device of this character, the oil and air mixture is arrested and thoroughly agitated until mixed to the proper degree, a result which cannot be obtained under ordinary conditions, under which conditions the air and oil are frequently discharged into a combustion chamber of an engine with uneconomic and disastrous results.

While I have shown and described the mixing chamber as provided with opposing series of circular corrugations, it should be understood that these corrugations may be varied in form and, in some instances, dispensed with, the arrangement of channels, however, being the same in each case.

The mixing chamber herein described and claimed embodies the general principles of the mixing chamber disclosed but not claimed in an application for patent for carbureters, filed by me March 11, 1909, Serial No. 482652.

I claim:

1. A carbureter mixing chamber having a bottom head, an intake-nozzle extending into the chamber from the head, a cap having a discharge aperture connected to the chamber top, and a dome disposed over and above the mouth of said nozzle, the dome being provided with a primarily flat surface opposite the nozzle mouth, the side-walls of the dome being terminated above the chamber bottom and parallel with the side-walls of said chamber and nozzle, whereby a series of communicating channels are formed between said nozzle mouth and cap aperture, through which the carbureted air is directed in a zigzag course.

2. A carbureter mixing chamber having a bottom head, an intake-nozzle extending into the chamber from the head, a cap having a discharge aperture in connection with the chamber-top, a dome disposed over and above the mouth of said nozzle, and a series of corrugations extending from the dome-head opposite the mouth of said nozzle, the side-walls of the dome being parallel with the side-walls of said chamber and nozzle with the lower edges thereof terminating above the chamber bottom, whereby a series of communicating apertures are formed between said nozzle mouth and cap aperture, through which the oil and air mixture is directed in a zigzag course.

3. A carbureter chamber having a bottom head, an intake-nozzle having its mouth extending into the chamber from the head, a series of corrugations disposed about the mouth of said nozzle, a cap provided with a discharge aperture in connection with the chamber top, a dome comprising a flattened head portion and depending side-walls supported within the chamber, the dome-head being provided with a series of corrugations opposite the corrugated mouth of the

aforesaid nozzle, and the side-walls of the dome being disposed parallel with the nozzle and chamber walls with their bottom edges terminating above the bottom of the chamber, whereby a series of communicating channels are formed, through which the oil and air mixture is adapted to pass in a zig-zag course through said chamber.

4. A carbureter mixing chamber having a bottom head, an intake-nozzle in connection with the head having its mouth extended into the chamber, a cap for the chamber provided with a discharge aperture, a dome disposed within the chamber having its head portion located above the nozzle mouth, the head and side-walls of the dome being respectively spaced from the mouth and side-walls of said nozzle and chamber walls to form a series of air channels of successively decreasing cross-sectional area.

5. A carbureter mixing chamber having a bottom head, an intake-nozzle having its mouth extending into the chamber from the head, a cap for the chamber provided with a discharge aperture, a dome comprising a flat head portion and depending side-walls supported in the chamber, oppositely disposed corrugations extending from the dome-head and nozzle-mouth, between which a channel is formed of slightly less area than said nozzle, the side-walls of the dome being respectively spaced from the side-walls of the nozzle and chamber to form a series of air channels of successively decreasing cross-sectional area.

In testimony that I claim the foregoing I have hereunto set my hand at Sun Prairie in the county of Dane and State of Wisconsin in the presence of two witnesses.

NICHOLAS P. MADER.

Witnesses:
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E. BATZ.