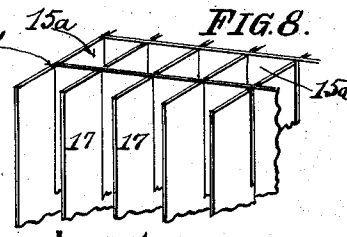
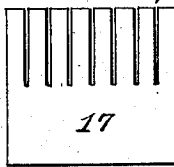
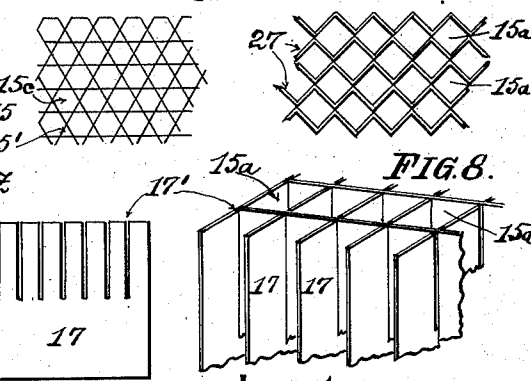
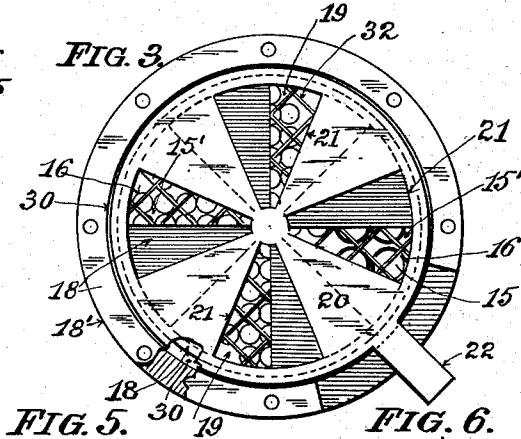
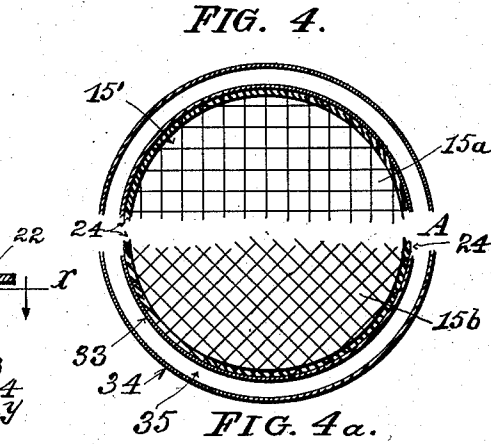
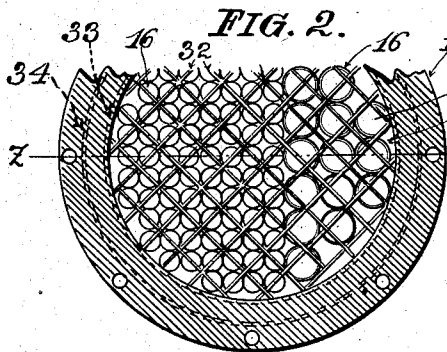
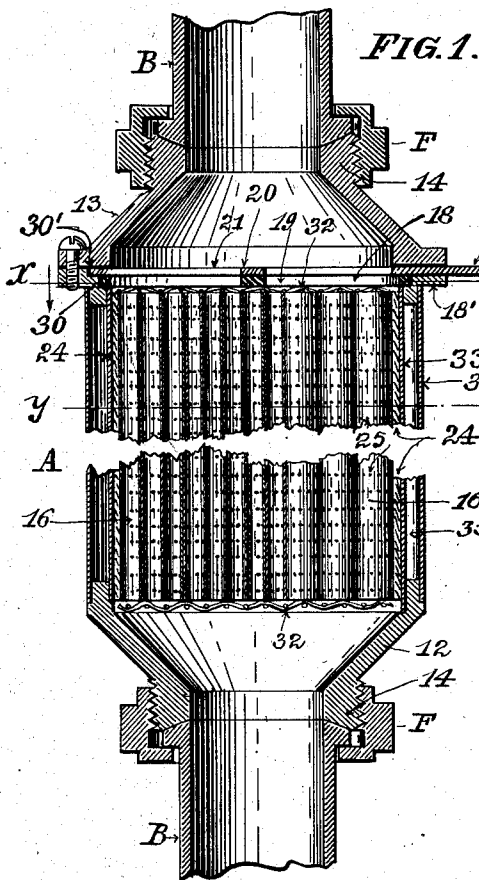


R. D. LOOSE.
MIXER FOR INTERNAL COMBUSTION ENGINES.
APPLICATION FILED FEB. 7, 1910.

1,012,380.

Patented Dec. 19, 1911.



Witnesses:

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FIG. 7.

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UNITED STATES PATENT OFFICE.

ROBERT D. LOOSE, OF CHICAGO, ILLINOIS.

MIXER FOR INTERNAL-COMBUSTION ENGINES.

1,012,380.

Specification of Letters Patent.

Patented Dec. 19, 1911.

Application filed February 7, 1910. Serial No. 542,503.

To all whom it may concern:

Be it known that I, ROBERT D. LOOSE, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Mixers for Internal-Combustion Engines; and I do hereby declare that the following description of my said invention, taken in connection with the accompanying sheet of drawings, forms a full, clear, and exact specification, which will enable others skilled in the art to which it appertains to make and use the same.

This invention has general reference to improvements in mixers for internal combustion motors; and it consists, essentially, in the novel and peculiar combination of parts and details of construction, as hereinafter first fully set forth and described, and then pointed out in the claims.

In the drawings already referred to, which serve to illustrate this invention more fully and form a part of this specification, Figure 1 is a longitudinal sectional elevation on line *z z* of Fig. 2, of this improved mixer. Fig. 2 is a sectional plan of a portion of the mixer, on line *x x* of Fig. 1, said section line passing through the flange of the casing and thence below the same and above the wire screen and the upper ends of the tubes. Fig. 3 is a plan of the mixer with the bonnet removed. Figs. 4 and 4^a, are sectional plan views of portions of the casing showing modified forms of the conduits therein. Figs. 5 and 6 are diagrammatic views of further modifications of said conduits. Fig. 7 is a view of a plate from which conduits may be formed, and Fig. 8 is a perspective view of a portion of a series of conduits constructed from a multiplicity of the interlocking plates illustrated in Fig. 7.

Like symbols and characters of reference indicate same or similar parts in all the drawings.

The object of this invention is the production of an effective mixer for internal combustion motors, whereby the explosive mixture of liquid hydrocarbon and air is more thoroughly mixed and better results obtained and this present invention is one of a series of improvements which I have invented and for which applications for Letters Patent are now pending in the United States Patent Office, this present invention having particular reference to details of construction of a mixer as disclosed in my

pending application, Serial No. 535,774, filed Dec. 31, 1909, and to which reference may be had regarding the obstacles and drawbacks which I am desirous of overcoming.

A, in the drawings designates a casing of suitable diameter and length. It may be circular in transverse section, or rectangular, oblong, polygonal, oval, or ovoid, according to the space available in internal combustion engines to which this invention is to be applied. This casing is of a diameter sufficiently larger than the diameter of the intake pipe B of said engine so that its actual area is at least fully equal to the area of said intake pipe B. In the preferred construction, this casing comprises an inner tube 33, and an outer tube 34, to afford an annular space 35, which functions as a non-conductor of heat in the well-known manner. At the bottom of this casing there is a flaring member 12, and at the top of said casing there is a similar flaring member or bonnet 13, there being on these two members means, 14, whereby the casing may be connected to the intake pipe B by either the usual flange, or a union-coupling F, as shown in Fig. 1.

In the casing A, I provide a series of vertically disposed, straight, and unobstructed conduits 15, preferably of small area, through which conduits the ascending, explosive mixture passes on its way to the engine cylinder or cylinders of said motor. These passages or conduits 15, are produced in various manners, the preferred method being by the employment of plain round tubes 16, as shown in Figs. 1, 2, and 3, said tubes being arranged close together and approximately filling the inner tube 33, and secured together in any approved manner, but they may also be formed by rectangular passages 15^a, as illustrated in Fig. 4; or 15^b, as shown in Fig. 4^a, and polygonal conduits 15^c, as shown in Fig. 5, while the rectangular conduits may readily be made from plates 17, as indicated in Fig. 7, said plates 17 having slots 17' reaching to one half of the width of the plates, the non-slotted portion being inserted in the slots of the respective plates so as to form the rectangular conduits 15^a, as indicated in Fig. 8. These rectangular conduits may, furthermore, be produced from crimped sheets 27, as indicated in Fig. 6.

The walls of the conduits may be non-

perforated, but I prefer that they be provided with a series of comparatively small holes 25, as illustrated in Fig. 1, which holes form capillary cells adapted to temporarily retain liquids, as will hereinafter more fully appear.

The upper end of the casing A has a flange 18', in the face of which there is an annular recess 30, Figs. 1 and 3, in which there is located a plate 18, having a series of openings 19; and a further recess 30', Fig. 1, in which there is located a circular disk, 20, having a series of openings 21, corresponding to the shape of the openings 19; a handle or other suitable means 22, projecting from said disk 20 being provided to afford means for oscillating said disk 20, which thereby serves as a cut-off in the well-known manner.

In order that the conduit-structure in the casing A may be removed therefrom, should such removal become necessary or desirable, I locate these conduits in a tube 24, Figs. 1 and 4, which tube 24 slides into the inner tube 33, when the plate 18, disk 20, and the bonnet 13, are removed from said casing, said tube 24 having wire screens 32 at its ends made from comparatively thin wire and wide-mesh, to retain said conduits in said tube 33, or in the tube 24, as the case may be, when the tube 33 is not being employed.

It will now be observed that both, the interior of the conduits as well as the interstices 15' between the conduits form passages for the explosive ascending mixture, which passages are straight and practically unobstructed. The function of these comparatively small passages is to break up the bulk of the ascending mixture into a large number of small columns. Any liquid matter, such as water, or unevaporated hydrocarbon carried by said mixture is retained in the cells 25 in the conduits until evaporated, so that said mixture after having passed through said conduits is freed from moisture and thoroughly mixed.

I desire to place emphasis upon the fact that in the preferred embodiment of this invention both, the interior of the conduits, and the interstices between these conduits through which the mixture ascends from passages for said mixture, so that only the lower, comparatively thin edges of these conduits are presented to the ascending mixture, whereby but a trifling and negligible obstruction is offered to the ascending mixture when entering said conduits.

In Figs. 1, 2, and 3, I have illustrated conduits formed of round or cylindrical tubes, and I have shown these tubes in several diameters in order to illustrate how tubes of different diameters may be used in the mixer. I desire it to be understood, however, that in practice there will be but

one size of tubes employed, and that the proper size of these tubes will be determined after exhaustive experiments in which I am engaged, have disclosed the most effective diameter that should be employed to attain the most favorable results. I have also shown in the drawings various shapes of conduits to illustrate several modifications thereof, all of which I believe to be equally efficient in service.

Having thus fully described this invention, I claim as new and desire to secure to me by Letters Patent of the United States—

1. A mixer for internal combustion engines, comprising, in combination, a casing, means at the top and the bottom of said casing whereby said casing is adapted for connection to the intake pipe of such engine, a regulating valve in said casing, a series of conduits in said casing occupying the entire interior space in said casing and affording a series of straight and unobstructed passages in said casing through said conduits and through the interstices between said conduits, said conduits having in their walls minute spaces adapted to retain moisture by capillary attraction, said conduits presenting to the ascending explosive mixture the narrow edges only, and means above and below said conduits to retain them in said casing.

2. A mixer for internal combustion engines, comprising, in combination, a casing, means at the top and the bottom of said casing whereby said casing is adapted for connection to the intake pipe of such engine, a series of conduits in said casing, said conduits being formed of cylindrical tubes occupying the entire interior space in said casing and affording a series of straight and unobstructed passages in said casing through said conduits and through the interstices between said conduits, said conduits presenting to the ascending explosive charge their narrow edges only, means for retaining said conduits in said casing, and means at the upper end of the casing for regulating the discharge from said casing.

3. A mixer for internal combustion engines, comprising, in combination, a casing, means at the upper, and at the lower ends of said casing for connecting the same to the intake pipe of said engine, a conduit-retaining tube within said casing, a series of conduits in said conduit-retaining tube occupying the entire interior space in said conduit-retaining tube and affording a multiplicity of straight and unobstructed passages in said casing through said conduits and through the interstices between said conduits, said conduits presenting to the ascending explosive charge narrow edges only, means above and below said conduits for retaining them in said conduit-retaining tube, and means at the upper end of said

casing including a flange, a wall at the upper end of said casing, said wall having a series of openings, a disk above said wall, said disk having openings corresponding to the openings in said wall, and means on said disk for oscillating said disk.

In testimony that I claim the foregoing

as my invention I have hereunto set my hand in the presence of two subscribing witnesses.

ROBERT D. LOOSE.

Attest:

MICHAEL J. STARK,
A. G. PETERSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."