R. E. KURTZ.

BREATHER PIPE.

APPLICATION FILED APR. 17, 1916.

1,280,047. Patented Sept. 24, 1918.

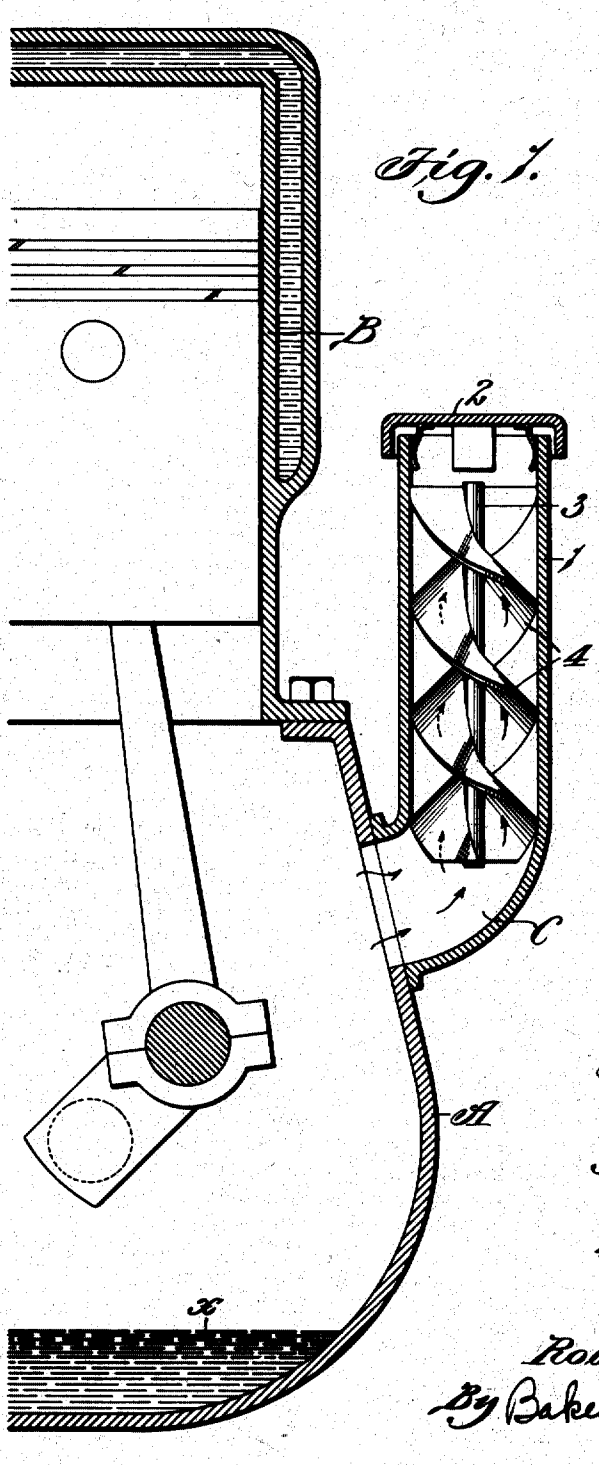


Fig. 1.

Fig. 2.

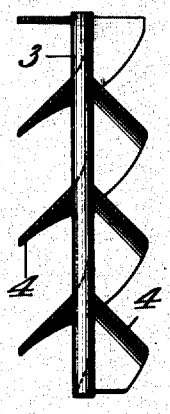
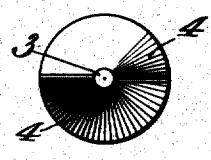


Fig. 3.



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UNITED STATES PATENT OFFICE.

ROBERT E. KURTZ, OF ST. LOUIS, MISSOURI.

BREATHER-PIPE.

1,280,047. Specification of Letters Patent. Patented Sept. 24, 1918.

Application filed April 17, 1916. Serial No. 91,715.

To all whom it may concern:

Be it known that I, ROBERT E. KURTZ, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Breather-Pipes, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to engines and machines of the type that comprise a crank case adapted to contain lubricating oil and equipped with a breather pipe through which gases or vapors in the crank case can escape from the crank case. When such machines are in operation the oil in the crank case is agitated violently or thrown upwardly, so as to lubricate certain parts of the machine, and this agitation or splashing of the oil produces a fine mist of oil in the crank case which becomes mixed with the vapor or gases that escape from the crank case through the breather pipe.

The main object of my invention is to provide a breather pipe for engines or machines of the type referred to, which is equipped with an efficient means of novel construction for separating the oil or other liquid from the gases or vapor that escape from the crank case through the breather pipe when the engine is in operation, thereby effecting a considerable saving in the consumption of oil and preventing the machine from becoming covered with oil in proximity to the breather pipe.

My invention is applicable to any kind of an engine or machine that comprises a crank case that contains lubricating oil, and which is equipped with a breather pipe, and while I have herein illustrated my invention embodied in a breather pipe for internal combustion engines, I wish it to be understood that the invention is not limited in its use to an internal combustion engine.

Figure 1 of the drawings is a vertical sectional view of a portion of an internal combustion engine equipped with a breather pipe constructed in accordance with my invention.

Fig. 2 is a vertical sectional view of the means that is arranged inside of the tubular shell of the breather pipe for effecting the separation of the oil from the gases or vapors that travel through the breather pipe; and

Fig. 3 is a top plan view of said means.

Referring to the drawings which illustrate the preferred form of my invention, A designates the crank case of an internal combustion engine which contains lubricating oil x that is agitated or thrown upwardly into the cylinder B of the engine when the engine is in operation. Said crank case is equipped with a breather pipe C whose upper end communicates with the atmosphere and whose lower end communicates with the interior of the crank case, as shown in Fig. 1, so that the gases or vapors in the crank case can escape therefrom, as indicated by the arrows in Fig. 1, when the engine is in operation. The fine oil mist that is produced in the crank case by splashing or agitation of the lubricating oil becomes mixed with the gases or vapors in the crank case, and consequently, considerable oil is carried out of the crank case by the gases or vapors that escape through the breather pipe.

In order to separate the oil from the gases or vapors that escape from the crank case I construct the breather pipe C in such a manner that it forms a relatively long passageway or a plurality of passageways, through which the escaping gases or vapors travel, the walls of said passageway having sufficient area and being of such form that the oil and other heavy particles of the mixture will be projected against said walls with considerable force, and thus be completely separated from the gases or vapors before said gases or vapors escape from the upper end of the breather pipe.

I prefer to form the breather pipe in such a manner that the escaping mixture will travel or whirl upwardly in a substantially spiral direction through a passageway whose walls slope downwardly and outwardly from the center axis of the breather pipe, as I have found that when the escaping mixture is subjected to a whirling motion through a passageway of the form mentioned there is a greater tendency for the oil and other heavy particles of the mixture to separate from the gases or vapor, due to the impact of the heavy particles of the mixture against the underside of the downwardly-inclined top wall of the passageway. The breather pipe can be constructed in various ways to accomplish the desired result above mentioned, and while I have herein illustrated only one form of my invention, I wish it to be understood that the in-

vention is not limited to a breather pipe of the exact construction herein illustrated.

The breather pipe C herein shown consists of a vertically-disposed, tubular-shaped shell 1 whose lower end communicates with the interior of the crank case A and whose upper end communicates with the atmosphere, the upper end of said shell being preferably closed by a removable cap or cover 2 which is so designed that the interior of the shell is always in communication with the atmosphere. The shell 1 is provided with a means that forms a spiral passageway or a plurality of spiral passageways through the shell whose top and bottom walls slope downwardly and outwardly from the longitudinal center axis of the shell, and while various means may be used for this purpose, the means that I prefer to use consists of a vertically-disposed shaft 3 arranged inside of the shell 1 and provided with vanes or blades 4 that extend spirally around said shaft from the lower to the upper end of same and which are disposed at an approximately acute angle to said shaft, as shown in Fig. 1. In the form of my invention herein illustrated the shaft 3 is provided with two spiral vanes, each of which is continuous and extends from the upper to the lower end of said shaft, said vanes sloping downwardly and outwardly from said shaft and the outer edges of said vanes bearing against the inner wall of the shell 1 so that the interior of said shell will be divided into two spiral passageways whose lower ends communicate with the interior of the crank case and whose upper ends terminate in proximity to the upper end of the breather pipe. The shaft 3 and the vanes thereon can be formed as a single unit that is removably mounted in the shell 1, or the outer edges of the vanes 4 can be permanently attached to the shell 1. It is essential, however, that the vanes be disposed at a substantially acute angle to the shaft 3, so that the top and bottom walls of the spiral passageways will slope downwardly and outwardly from the shaft 3. When the engine is in operation the oil-laden vapors or gases in the crank case escape from same and travel upwardly through the spiral passageways in the breather pipe, as indicated by the arrows in Fig. 1. The downwardly-inclined spiral vanes 4 not only impart a whirling motion to the escaping mixture but they also crowd the mixture inwardly toward the longitudinal center axis of the breather pipe, thereby causing the oil and other heavy particles of the mixture to be projected against the downwardly-inclined top walls of the spiral passageways with considerable force. Consequently the oil in the mixture will be completely separated from the gases or vapors, the oil adhering to the spiral vanes 4 and being conducted by same back to the crank case or to any other suitable oil container. A breather pipe of the construction above described not only effectively separates the oil from the gases or vapors that escape from the crank case and thus reduces the oil consumption and prevents the machine from being covered with oil in proximity to the breather pipe, but it also insures a free escape or passage of the gases or vapors from the crank case, this latter feature being due to the fact that the gases follow a regular path in traveling through the breather pipe. Furthermore, as the breather pipe has a surface of relatively great area that is engaged by the gases or vapors that travel through the breather pipe, there is a tendency for the gases or vapors to become condensed in traveling through the breather pipe. As previously stated, it is immaterial, so far as my broad idea is concerned, whether the spiral vanes 4 are permanently connected to the shell 1 or are arranged in said shell in such a manner that they can be removed therefrom. I prefer, however, to construct the breather pipe in the particular manner herein illustrated, namely, with the spiral vanes 4 removably mounted in the shell, for such a construction makes it possible to convert an ordinary straight tube breather pipe into a breather pipe embodying my invention by simply arranging a vertically-disposed shaft equipped with spiral vanes in a straight tube breather pipe.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is:

1. A breather pipe for machines of the character described provided with a spirally wound member that is engaged by a mixture traveling through the breather pipe, said member being arranged at approximately an acute angle with reference to the longitudinal center axis of the breather pipe so that the mixture will be constantly thrown inwardly toward the center of said member.

2. A breather pipe for machines of the character described provided with a substantially spiral passageway through which the mixture passing through the breather pipe travels, the top and bottom walls of said passageway sloping downwardly and outwardly from the longitudinal center axis of the breather pipe.

3. A breather pipe for machines of the character described, comprising a vertically-disposed, tubular-shaped member having a spiral vane inside of same, which slopes downwardly and outwardly from the center axis of said member so that the mixture passing through the breather pipe will be forced inwardly toward the center axis of said member.

4. A breather pipe for machines of the character described, comprising a vertically-

disposed, tubular-shaped member, and a shaft arranged inside of said member and equipped with downwardly-inclined vanes that extend spirally around same so as to deflect the mixture passing through the breather pipe inwardly toward the center of said member.

5. A breather pipe for machines of the character described, comprising a tubular-shaped shell of cylindrical form, and downwardly-inclined spiral vanes arranged inside of said shell with their edge portions bearing against the inner wall of said shell so that the mixture passing upwardly through said shell will be deflected inwardly toward the center of said shell.

6. A breather pipe for machines of the character described, comprising a tubular-shaped member, and an oil-separating device removably mounted in said member and consisting of a shaft provided with spirally wound vanes that are inclined downwardly and outwardly with relation to said shaft so that the mixture passing through said member will be deflected inwardly toward the center of said shell.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this thirteenth day of April, 1916.

ROBERT E. KURTZ.

Witnesses:
WELLS L. CHURCH,
GEORGE BAKEWELL.