No. 679,678. Patented July 30, 1901.

L. B. KING.

STEAM SEPARATOR FOR USE IN STEAM ENGINES.

(Application filed Jan. 7, 1901.)

(No Model.)

Fig 1

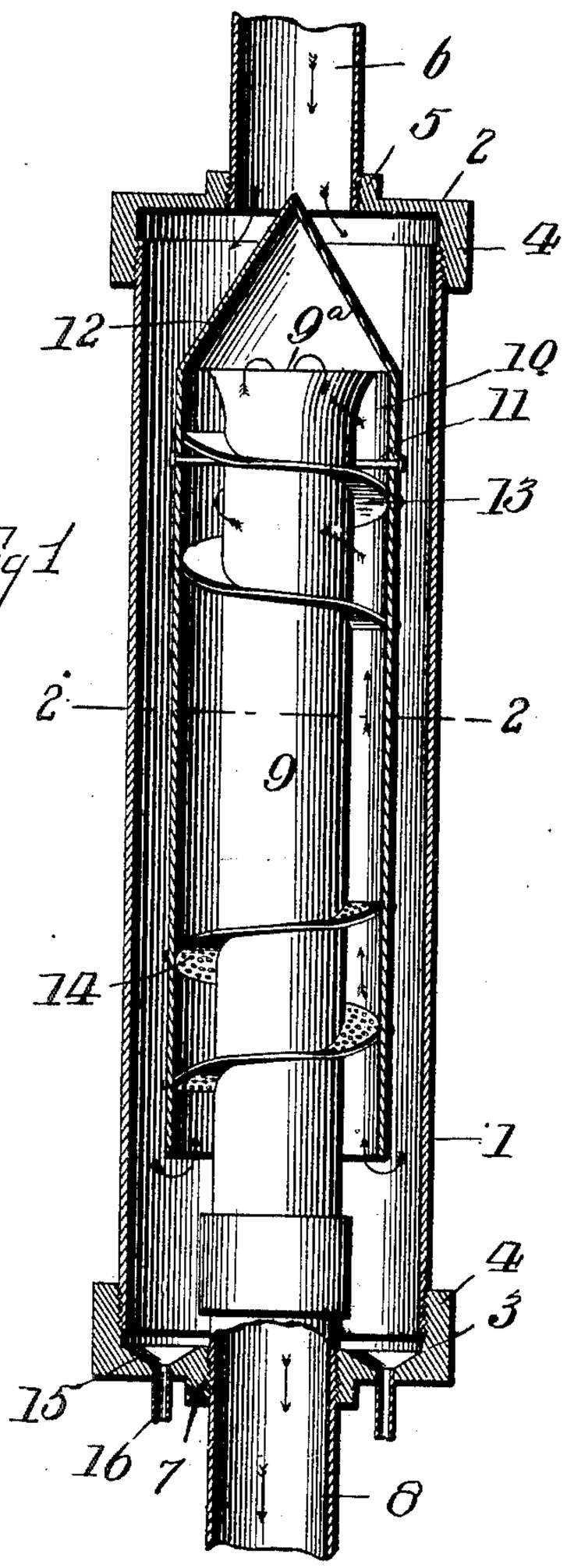
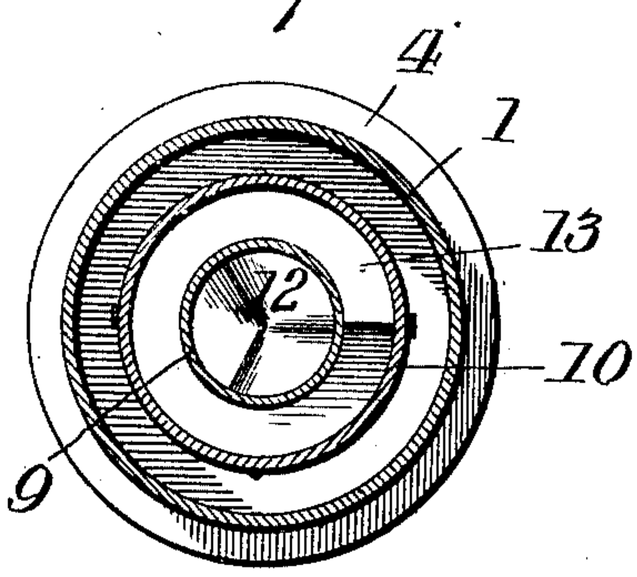


Fig 2



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UNITED STATES PATENT OFFICE.

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STEAM-SEPARATOR FOR USE IN STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 679,678, dated July 30, 1901.

Application filed January 7, 1901. Serial No. 42,451. (No model.)

To all whom it may concern:

Be it known that I, LESTER B. KING, a citizen of the United States, residing at Staunton, in the county of Macoupin and State of Illinois, have invented certain new and useful Improvements in Steam-Separators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to steam-separators, and has special reference to that type of separators which are utilized in connection with a steam-supply pipe for conducting live steam from a boiler to an engine.

To this end the invention primarily contemplates a simple and practical construction of steam-separator adapted to be interposed in the line of a steam-supply or live-steam pipe and comprising means for effecting a thorough separation of water from the steam to insure the delivery of dry steam to the engine, and thus obviating the injurious effects caused by water passing with the steam into an engine.

With these and other objects in view, which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the accompanying drawings, Figure 1 is a vertical sectional view of a steam-separator constructed in accordance with the present invention. Fig. 2 is a cross-sectional view on the line 2 2 of Fig. 1.

Like numerals of reference designate corresponding parts in both views of the drawings.

In carrying out the invention the same may be arranged at any convenient point in the line of a live-steam pipe; but to secure the best results the separator is disposed in an upright or vertical position. In its general organization the separator comprises an exterior cylindrical casing or shell 1, serving to house the interior parts and of any suitable dimensions as may be found best suited for a practical carrying out of the invention. The said cylindrical casing or shell is preferably constructed with exteriorly-threaded open end portions, covered, respectively, by the upper and lower end caps 2 and 3, said caps being provided with interiorly-threaded flanges 4 and detachably engaging the exteriorly-threaded ends of the casing or shell, thereby providing removable closures for the ends of the casing or shell in order to provide for the convenient assembling of parts as well as for their ready separation for purposes of repair or adjustment.

The upper flanged end cap 2 is provided with a central threaded neck 5, coupled to the inlet-section 6 of the steam-supply pipe, while the lower cap 3 is also provided with a central threaded neck 7, coupled to the outlet-section 8 of the steam-supply pipe, said outlet-section leading to the engine, while the said inlet-section 6 leads from the boiler. The said outlet-section 8 of the steam-supply pipe has an extension within the casing 1 constituting an interior upright stand-pipe 9, which may be either an integral portion of the pipe-section 8 or a separate pipe coupled thereto, as shown in the drawings. In either event the interior stand-pipe 9 extends upwardly within the casing 1 nearly the full length thereof and is adapted to be incased within an interior inverted deflecting-drum 10. The deflecting-drum 10 is in the form of a cylinder, which may be said to be interposed between the pipe 9 and the casing 1, said drum 10 being rigidly supported upon the pipe 9 by means of the stud-bolts 11 or equivalent fastenings and extends from the extreme upper end of the casing 1 to a point short of the bottom thereof. The said drum 10 is open at its lower end to receive therein the ascending steam, as indicated by the arrows, and is provided at its upper closed end with an imperforated conical top deflector 12, the apex of which projects into the inlet-port of the separator, and the base of which conical portion lies in substantially the transverse plane of the upper end 9^a of the pipe 9, said upper end 9^a being flared to insure a freer circulation of steam into the same.

There are associated with the interior drum 10 separate reversely-related baffle-plates 13 and 14, arranged, respectively, within the upper and lower portions of the drum and encircling the stand-pipe 9. Both of the baffle-plates 13 and 14 extend transversely across the space or interval between the pipe

9 and the drum 10 and encircle the pipe 9 spirally for a portion of its length, each of said spirally-running plates being preferably extended around the stand-pipe 9 one and one-half times, although a greater or shorter length of spiral may be utilized, if found desirable; but in order to effect a proper retarding of the steam to insure a complete separation of the water the spiral plates 13 and 14 are respectively coiled about the stand-pipe reversely or in opposite directions to each other, and the upper spiral plate 13 is imperforate, while the lower plate 14, contiguous to the lower end of the drum 10, is perforated.

The water which is separated form the steam falls into a collecting-gutter 15, formed within the lower end cap 3 and having drain connections 16 therewith to provide for constantly draining off the water and preventing accumulation thereof.

In the action of the separator the steam entering the pipe-section 6 is spread at the top of the casing by the deflector 12 and is deflected downwardly on the outside of the drum 10 into the bottom portion of the casing or shell, from which point it passes upwardly within the drum 10 and, first striking the lower perforated spiral plate 14, is relieved further of water and then striking the upper and second imperforate plate 13 is subjected to a final separating action before entering into the upper end of the stand-pipe, and thence to the engine.

Various changes in the form, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. A steam-separator comprising a casing having the oppositely-arranged steam inlet and outlet, a stand-pipe arising within the casing from the steam-outlet, a deflecting-drum inverted over the stand-pipe, and separate baffles arranged about the stand-pipe respectively within the upper and lower end portions of the drum.

2. A steam-separator comprising a casing having the opposite steam inlet and outlet, a stand-pipe arising within the casing from the steam-outlet, a deflecting-drum inverted over the stand-pipe, and spiral baffle-plates encircling the stand-pipe within the drum.

3. A steam-separator comprising a casing having the oppositely-arranged steam inlet and outlet, a stand-pipe arising within the casing, a drum inverted over the stand-pipe, and upper and lower spiral baffle-plates arranged about the stand-pipe within the drum, and respectively coiled reversely or in opposite directions to each other.

4. A steam-separator comprising a casing having the oppositely-arranged steam inlet and outlet, and also provided with a water-drain at the bottom, a stand-pipe arising within the casing from the steam-outlet, a drum inverted over the stand-pipe and provided with a lower open end and a closed conical upper end, and spiral baffle-plates arranged within the upper and lower portions of the drum, and respectively imperforate and perforate.

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