H. F. Snyder,

2. Sheets, Sheet 1.

Safety Valve.

No. 110,082. Patented Dec. 13. 1870.

Fig. 1.

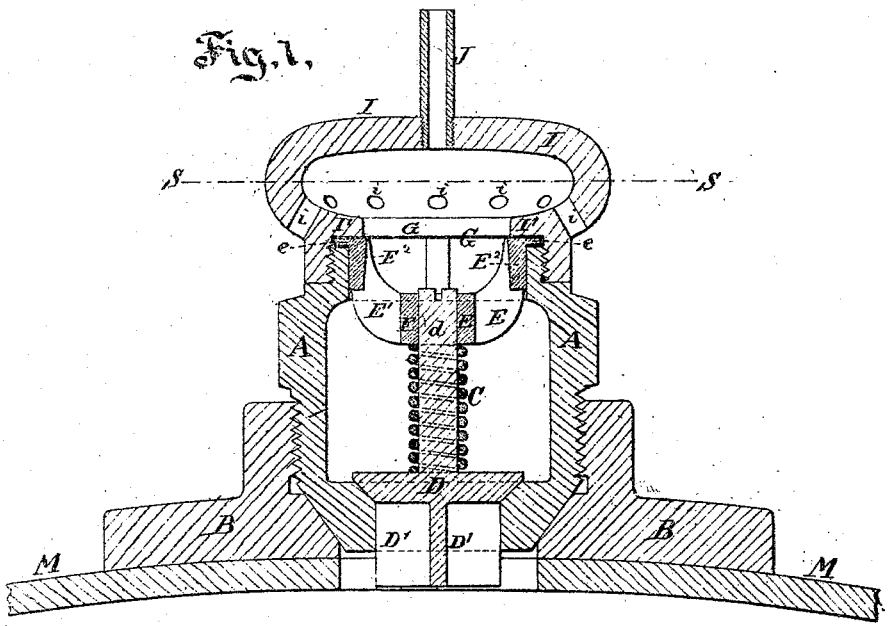
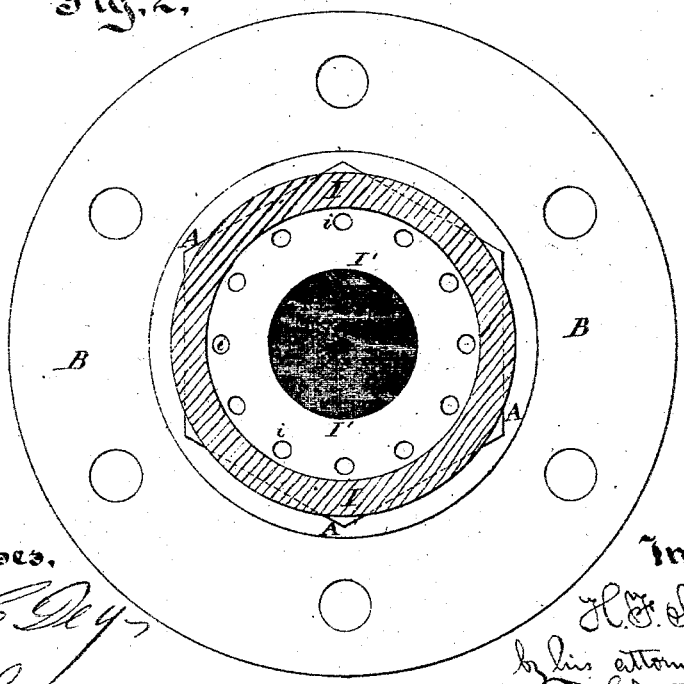


Fig. 2.



Witnesses,

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by his attorney

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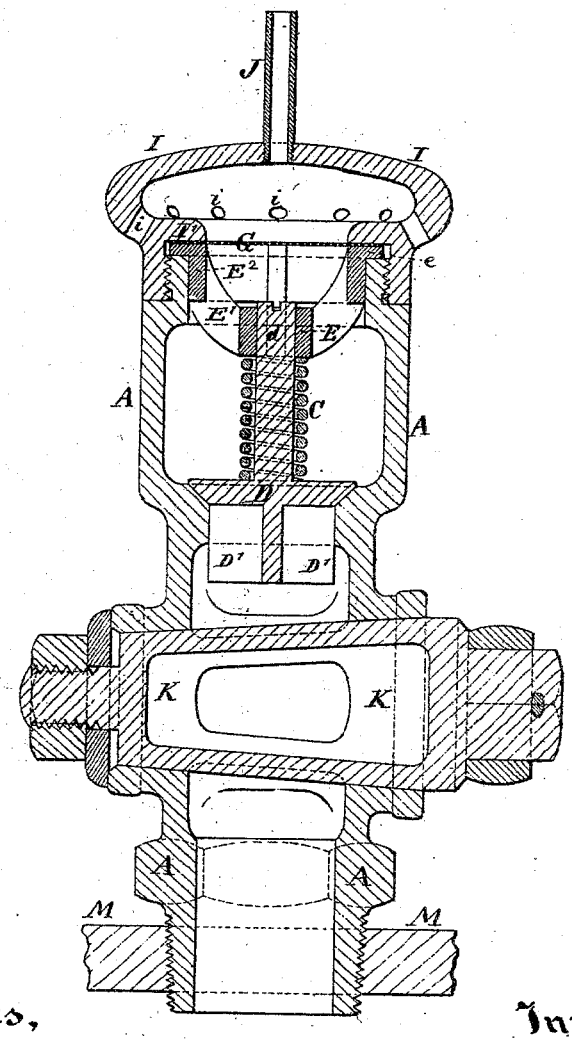
2. Sheets, Sheet 2.

H. F. Snyder,

Safety Valve.

No. 110,082. Patented Dec. 13. 1870.

Fig. 3.



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United States Patent Office.

HENRY F. SNYDER, OF WILLIAMSPORT, PENNSYLVANIA.

Letters Patent No. 110,082, dated December 13, 1870.

IMPROVEMENT IN SAFETY-VALVES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, HENRY F. SNYDER, of Williamsport, in the county of Lycoming, in the State of Pennsylvania, have invented certain new and useful Improvements in Safety-Valves, adapted more particularly for use on oil-tank cars; and I do hereby declare the following is a full and exact description thereof.

I will first describe what I consider the best means of carrying out my invention, and will afterward designate the points which I believe to be new.

The accompanying drawing forms a part of this specification.

Figure 1 is a central vertical section through the valve, and its housing and connection with a portion of an oil-tank car, to which it is fitted.

Figure 2 is a horizontal section.

The above show some of the important features without the stop-cock.

Figure 3 shows the same with a stop-cock, which renders this the most perfect form of the construction.

Similar letters of reference indicate corresponding parts in all the figures.

A is a stout casing or casting, of brass or other suitable material, threaded on the exterior and around its waist, and finished conically below, to match a corresponding portion in the massive casting or fixture B, which is bolted upon the tank M, as will be understood.

The casing A is made hexagonal about this threaded belt, to allow its being conveniently inserted into B, and removed therefrom.

The interior carries a conical valve, D, having wings D', which guide it in an obvious manner as it rises to allow the escape of vapor, and again sinks upon the corresponding seat.

It is pressed downward by a coiled spring, C, which coils around the stem *d*, and acts against a steadiment, E, as an abutment.

This steadiment is supported in a central position by arms E^1, from a ring, E^2, which fits within the contracted upper portion of the casing A, and is held up by a flange, *e*.

The upper portion of the casing A is threaded on its exterior, as represented, and adapted to receive a screw-cap, I, provided with vents or apertures *i*, which may be directed downward or upward, as may be preferred, or both together may be employed, as represented. There may, if preferred, be but a single aperture in the upper side, and this may be provided with a small tube, as indicated by J, which shall serve as a burner. It may be made in the style of a gas-burner, and may be shielded by a chimney of glass or other material to protect it from wind.

By such devices, any vapor escaping through the safety-valve may be burned as fast as it escapes, and the car may be moved rapidly or exposed to violent winds or other disturbing influences without extinguishing the flame. The device may also be accompanied by a small lamp, supplied with petroleum or the like, and fed by a wick so as to constantly maintain a small flame in the vicinity of this gas-burner J.

By such arrangement, although a temporary suspension of the escaping vapor will entirely suspend the combustion due to gas or vapor, the lamp will maintain an igniting flame in such a position that the moment a flow of vapor is resumed it will again ignite, and the vapor will be burned as before.

Such complex arrangements contribute to increase the safety due to my invention, but I do not esteem them necessary for general practice, except in all cases when cars or receptacles for petroleum or other volatile hydrocarbons are exposed in the open air, the vapor may be allowed to blow away unconsumed. And when vapor is found to escape in a close building, the jets once ignited will remain so, and will burn up all the vapor without such additional precautions.

I provide an internal flange, I', within the screw-cap I, which, pressing down firmly upon the flange *e* and the adjacent portion of the ring E^2, holds in position a wire-gauze strainer, marked G, which has the effect, long ago published by Sir Humphrey Davy and others, of preventing the passage of flame.

In case the escaping vapor burns, being ignited either intentionally or accidentally, and the flame extends inward into the interior of the screw-cap I, this strainer G prevents the flame from extending below it. The vapor may burn as it rises slowly through the wire-cloth, and under the arrangement shown may be fed with air through some of the holes *i*, and the heated products of combustion may escape freely through other holes, the choice of holes being controlled by the direction of the wind or other causes. In case there are sufficient holes both above and below, the air will ordinarily enter through the lower ones, and the products of combustion escape through the upper hole or holes.

It is not usually important to maintain a high degree of tension on the spring C. It is important simply to hold it in its seat with sufficient firmness to prevent its rising by any accidental jarring, or by the gravity either of itself or of the contents of the tank in case of an inclination, or of a partial or complete overturning of the tank in case of accident.

The entire apparatus may be made small. My experiments have been made with a valve of the exact size here represented.

Fig. 3 represents the casing A as made longer, and having a stop-cock, K, mounted therein. By turning

this cock the entire passage is stopped under all circumstances. It is particularly important in case of derailment and a partial or complete overturning of the tank, and may be used with advantage in standing where any escape of vapor would be objectionable.

I claim—

1. The combination of the casing A and its contained safety-valve, and guiding and operating means with the strainer G, adapted to prevent any possible access of flame from the exterior to pass the valve, as specified.

2. The perforated cap I *i*, in combination with the casing A and its contained safety-valve, and guiding and operating means, as specified.

3. The combination of the screw-cap I *i*, flange I′, metallic strainer G, valve D D′ *d*, steadiment E E^1 E^2, and casing A, constructed as represented, and adapted to serve relatively to the casing B and tank A, as and for the purposes herein set forth.

4. The stop-cock K, arranged relatively to the safety-valve D, spring C, and strainer G, as and for the purposes herein specified.

In testimony whereof, I have hereunto set my name in presence of two subscribing witnesses.

H. F. SNYDER.

Witnesses:

T. C. ROGERS,

H. D. HEISER.