(No Model.)

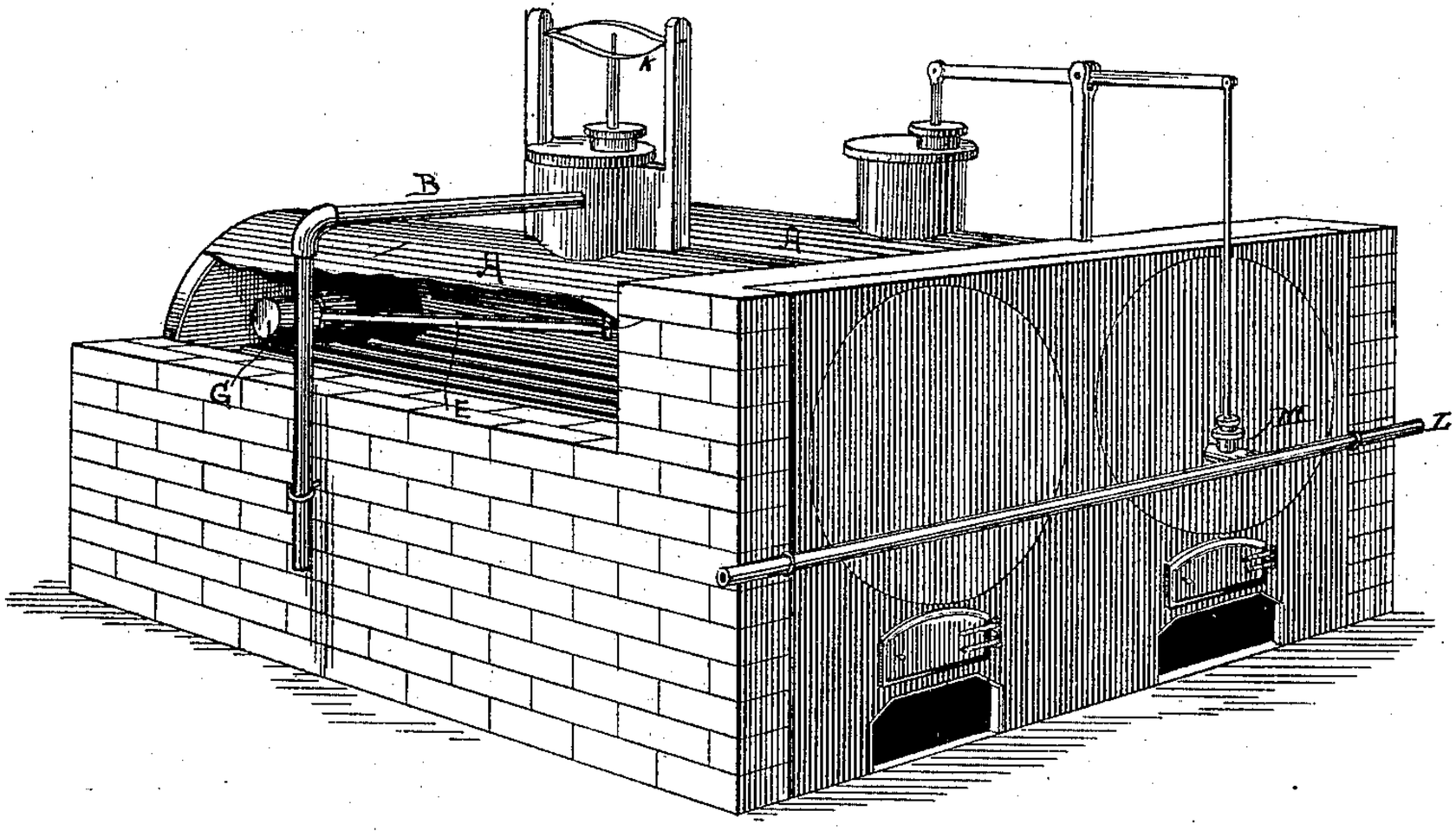
2 Sheets—Sheet 1.

S. C. SALISBURY.

FEED WATER REGULATOR.

No. 246,215. Patented Aug. 23, 1881.

Fig. 1.



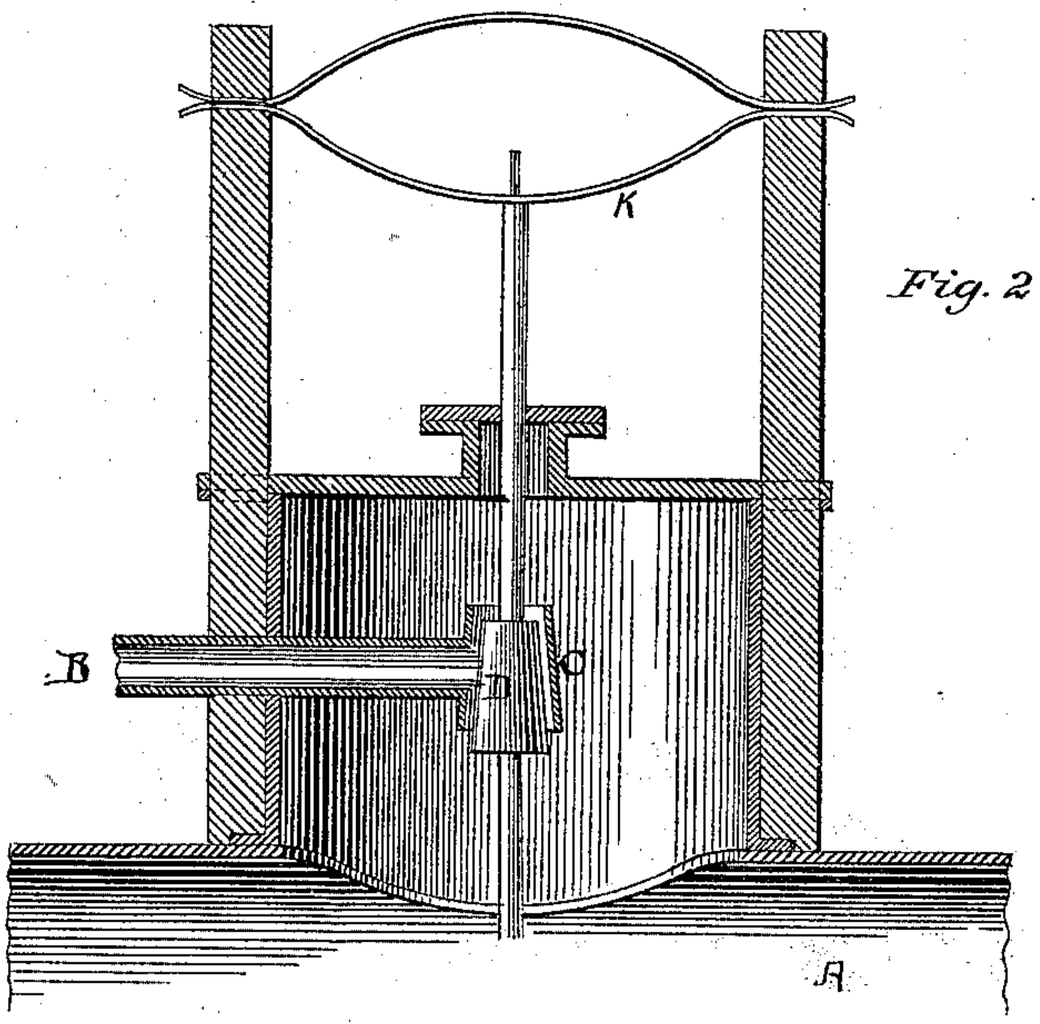


Fig. 2.

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Fig. 3.

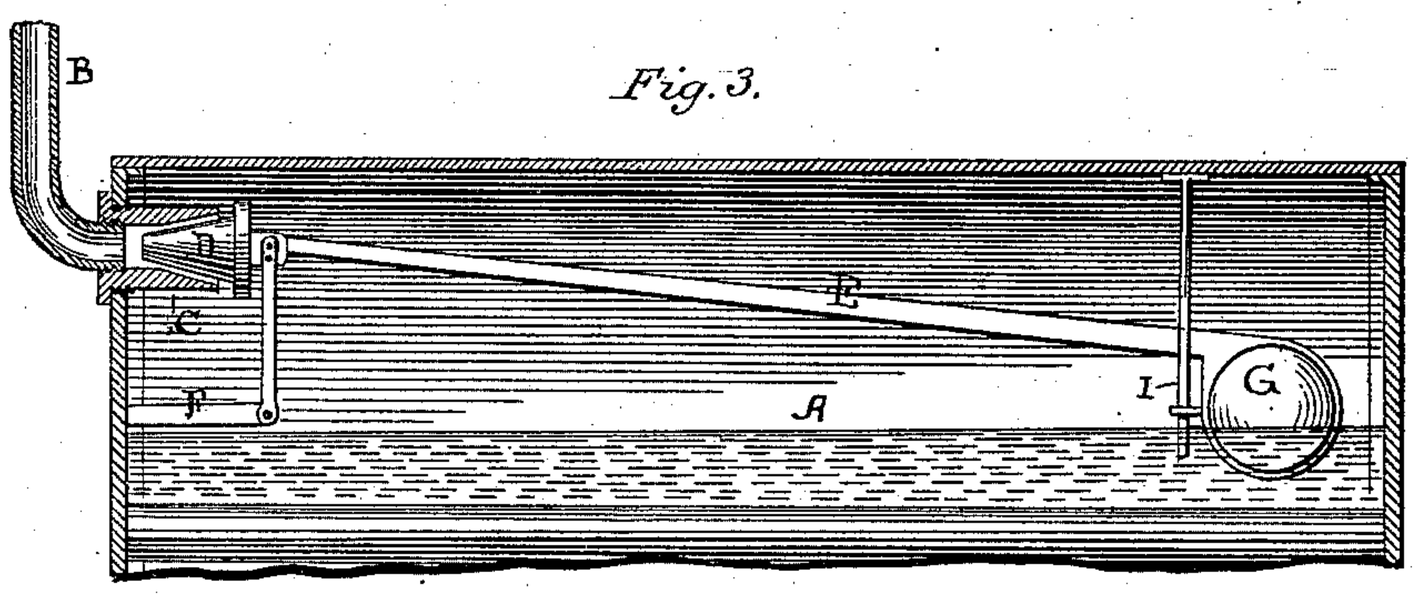


Fig. 4.

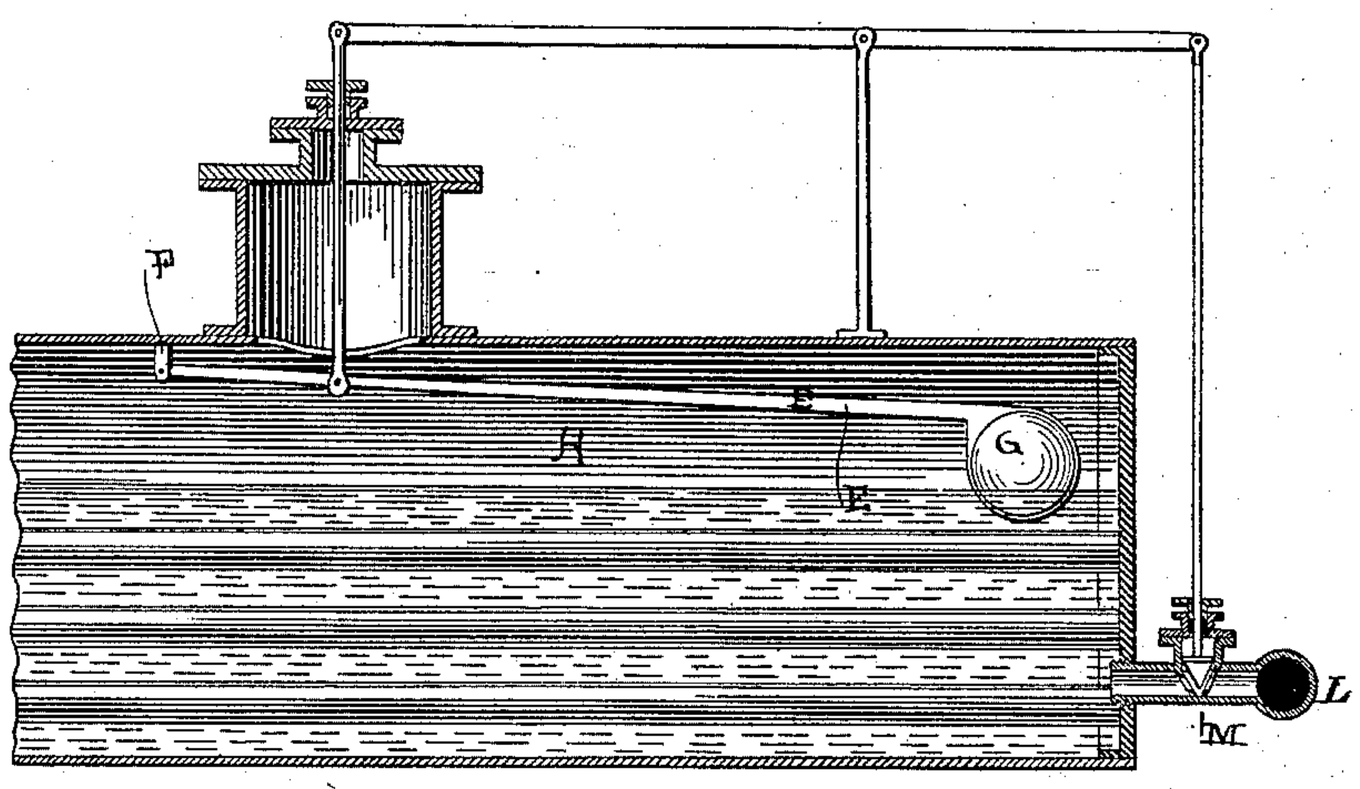


Fig. 5.

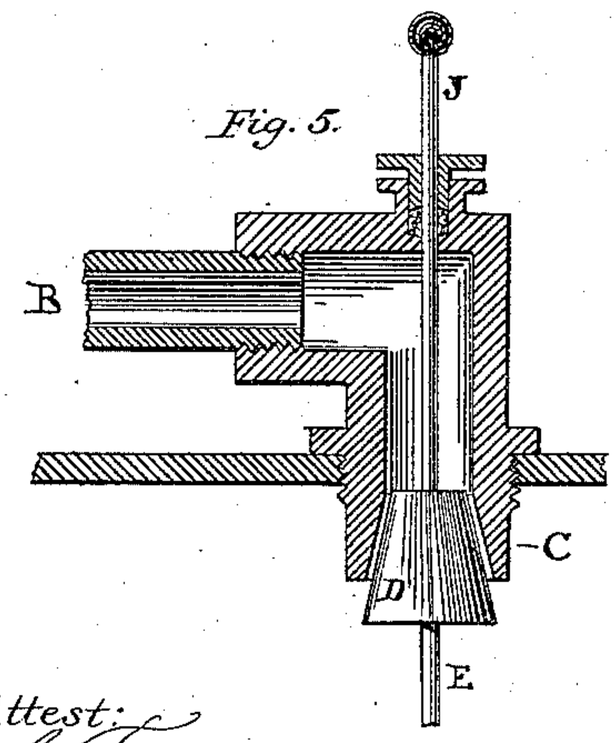
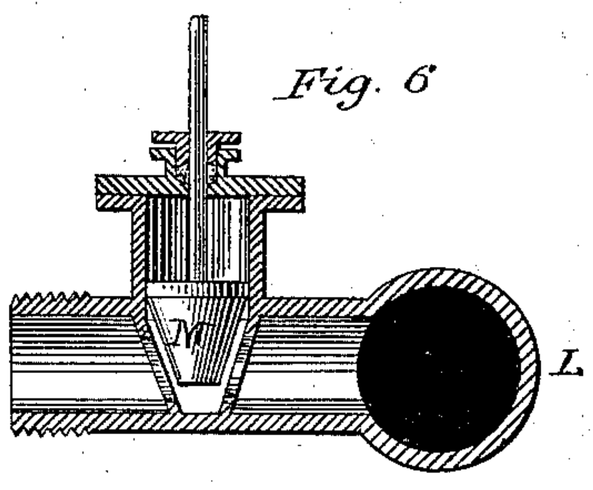


Fig. 6



Attest:
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Inventor:
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UNITED STATES PATENT OFFICE.

SILAS C. SALISBURY, OF NEW YORK, N. Y., ASSIGNOR TO THE AMERICAN NON-EXPLOSIVE BOILER ATTACHMENT COMPANY, OF SAME PLACE.

FEED-WATER REGULATOR.

SPECIFICATION forming part of Letters Patent No. 246,215, dated August 23, 1881.

Application filed May 23, 1881. (No model.)

To all whom it may concern:

Be it known that I, SILAS COVEL SALISBURY, of the city, county, and State of New York, have invented a new and useful way of controlling the admission of feed-water to steam-generators; and I do hereby declare that the following is a full and exact description of the same.

It is a desideratum in steam-generators to secure a continuous feed exactly graduated to the evaporation in the boiler, because such continuous feed will relieve the boiler-plates from the great and unequal strains to which they are subjected by the sudden fluctuations of temperature due to an irregular or intermittent introduction of cold water. The desired regularity of feed can only be obtained by automatic means, and so far as I am aware has never been attained heretofore.

My invention consists in an automatic regulating-valve in the steam-pipe, which supplies steam to operate the feed-water pump, whereby the action of said pump is made directly dependent upon the state of the water in the boiler, whereby, when the engine is running or steam is being expended, the water-feed will be automatically commenced, and when the apparatus is in proper adjustment made continuous and exactly proportioned to the expenditure of steam. When several boilers are coupled in one bench, although the steam-pressure may be uniform in them all, the actual evaporation and height of water may differ in the several boilers. These boilers may all be fed by a single pump, but the admission of feed-water to each must be separately controlled. Therefore, while the gross evaporation from all the boilers may be the measure for the gross supply, the subdivision of that supply will be the subject of separate treatment.

My invention therefore also consists in a feed-pipe common to several boilers and regulating-gates in the lateral pipes from said feed-pipe to the several boilers, said gates being operated by mechanism controlled by the water within the boiler. There are also other minor points of novelty, which will be pointed out hereinafter.

That others may fully understand my improvement, I will more particularly describe it, having reference to the accompanying drawings, wherein—

Figure 1 is a sectional perspective of a bench of boilers with my invention attached. Fig. 2 is a transverse section of the steam-dome, showing the valve. Fig. 3 is a longitudinal section of the boiler. Fig. 4 is a similar section, showng the feed-water. Fig. 5 shows a modification in the mounting of the steam-valve. Fig. 6 shows the feed-water valve enlarged.

A is the boiler, and it may be of any appropriate pattern or mode of construction.

B is the steam-pipe, which takes steam to the pump whereby the feed-water is forced into the boiler.

C is the valve-seat at the inner end of the steam-pipe B, and D is the cone-valve fitted to said seat. The seat C may be placed transverse to the inlet end of pipe B, or in line with it, as may be desired. When transverse it is open at each end, so that there will not be any place in the valve-case for a lodgment for obstructing matter. The valve D is accurately fitted to the valve-seat C, so that when it is fully seated therein the pipe B will be fully and securely closed; but when the valve is partly withdrawn steam may escape, and the volume permitted to pass will be exactly proportioned to the movement of the valve. The valve D, being placed transversely across the pipe B, will therefore be effectually balanced and require the same amount of force to move it at one point as at another.

The valve D is mounted at the end of a lever, E, the fulcrum whereof may be supported by a bracket, F, and at its opposite end said lever is provided with a float, G, which rests upon the surface of the water and rises or falls with every change of the level of the same, so that when the water-surface sinks the float G causes the valve D to open, and when the surface rises with the admission of more water the float rises also and closes the valve D.

It is evident that it is easy to adjust the valve on its lever E so that at the normal height of water-level the valve D shall stand

open a distance which will discharge a quantity of steam just sufficient to balance the steam expended in the regular work of the engine supplied by that particular generator, and that thereafter any change in the expenditure of steam will be immediately followed by a change of water-level and a corresponding change in the water-feed.

A valve transverse to the steam-pipe will sometimes be less desirable than a valve in line with said pipe, because, for instance, valves will become obstructed with silt more readily with some waters than with others; and it may be important to make the valve-seat easily removable for cleansing or repairs. This may be accomplished by inserting the valve-seat through the shell of the boiler from the outside, as shown in Figs. 3 and 5. It may then be easily removed and replaced.

The valve-lever E is pivoted to a bracket within the boiler, and the float may be restrained from side swaying by a guide-rod, I, or by other proper means.

It may be desirable sometimes to open the steam-valve D while the water is still high, and I have therefore provided a valve-stem, J, which projects through a stuffing-box and is accessible from the outside.

It has also been found desirable to counterpoise the float, in order to increase its steadiness and to promptly counteract any tendency of the valve to stick, because the float being very light its gravity is not equal to the weight of the water which it may displace, and therefore it does not act downward with a force equal to its upward thrust when the water rises in the boiler. The desired counterpoise may be obtained by a spring, K, or a weighted lever outside the boiler.

In some cases several boilers are coupled in one bench and fed by one pump which is kept constantly in motion forcing water through a feed-pipe, L, which is provided with short branch pipes and valves M communicating with each boiler. In Fig. 1 one of said branches only is shown. I then provide an outside lever, P, which is connected at one end with the float-lever E within the boiler, and at its outer end it is attached to a valve or gate, M, in the feed-water pipe L, usually in front of the boiler. By this means the quantity of water admitted to each boiler is controlled entirely by the position of the water-level and float within the boiler, so that the feed of each of several boilers from one feed-water pipe common to them all will be automatically self-regulated.

Having described my invention, what I claim as new is—

1. Combined with a steam-generator, a balanced cone-valve transverse to the port of the steam-pipe, whereby steam passes to operate the feed-pump, and a controlling-lever fulcrum and float governed by the height of water in the generator, as fully set forth.

2. A steam-generator and a feed-pump connected therewith to supply said generator with water, combined with mechanism automatically controlled by the height of the water-level to govern the quantity of steam supplied to said feed-pump, and thereby make the water-feed dependent upon and controlled by the quantity of water being evaporated.

3. A lever within the boiler pivoted to a fulcrum attached to the shell of the boiler, and provided with a controlling-float at one end of said lever, and an automatic valve at the other end, also within the boiler, to control the escape of steam to the feed-pump, combined with a stem extending from said valve through the shell of the boiler, whereby said valve may be moved from the outside either to open or close said valve independent of the float.

4. A lever within the boiler pivoted to a fulcrum attached to the shell of the boiler, and provided with a controlling-float at one end, an automatic valve at the other end, also within the boiler, and a stem extending from said valve through the shell of the boiler, combined with a counterpoise spring or weight, whereby the drop of the float and movement of the valve may be assured and sticking effectually prevented.

5. In a bench of boilers coupled together, and a feed-pump and pipe common to them all, a valve in the steam-pipe which supplies steam to the pump, controlled automatically, as described, combined with valve M in said feed-pipe, also automatically controlled, as set forth, whereby the action of the pump may be controlled by the gross evaporation and the water-feed may be proportioned to the evaporation in each boiler separately.

6. Combined with a steam-generator, a balanced cone-valve, D, transverse to the port of the steam-pipe B, whereby steam passes to operate the feed-pump, and a controlling-lever and float governed by the height of water in the generator, as set forth.

SILAS COVEL SALISBURY.

Witnesses:
HENRY DIES,
ROB. WILSON.