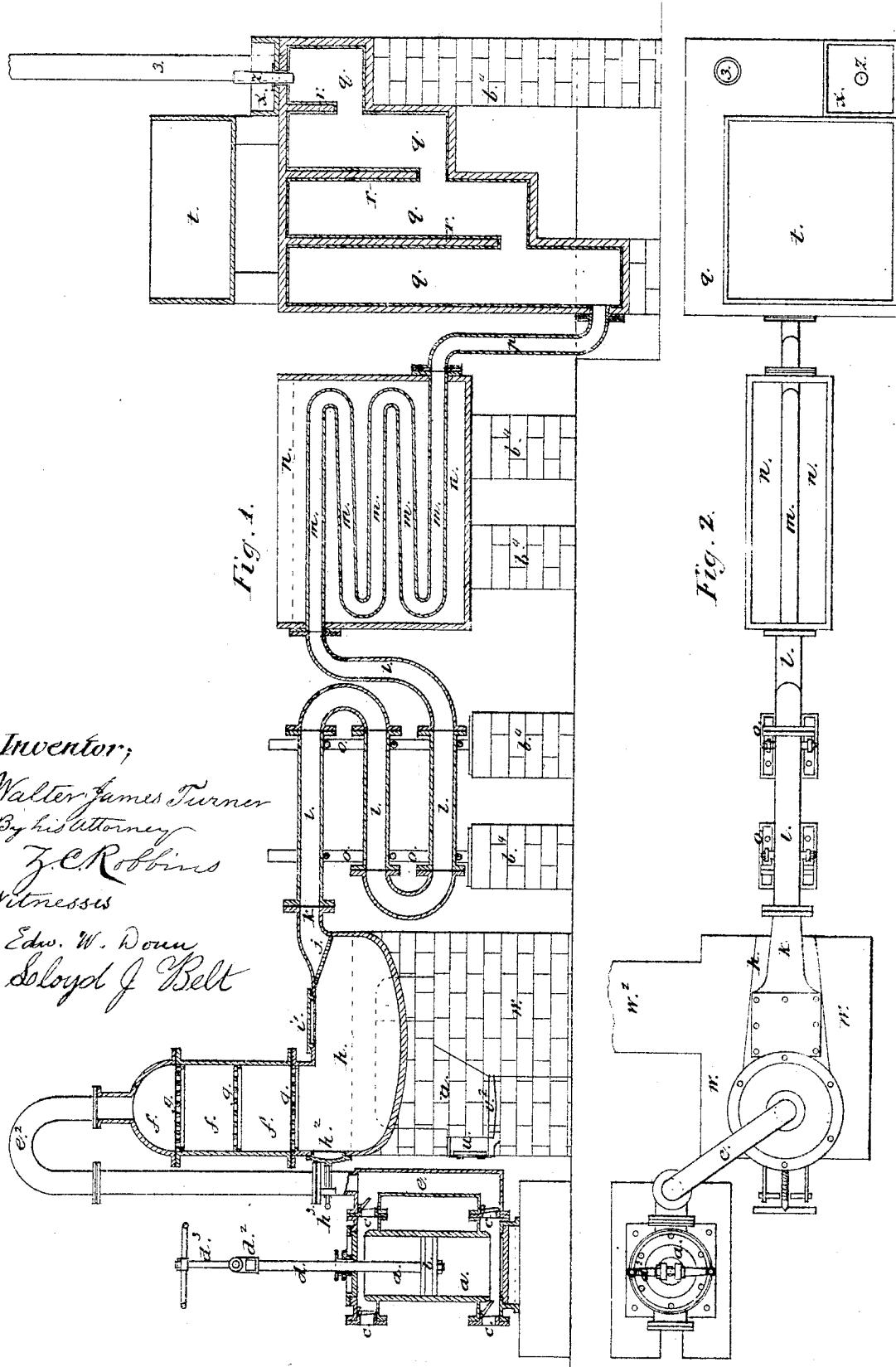


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Improvement in Apparatus for the Manufacture  
of Bi-Sulphites.

No. 123,799.

Patented Feb. 20, 1872.



## UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN APPARATUS FOR THE MANUFACTURE OF BISULPHITES.

Specification forming part of Letters Patent No. 123,799, dated February 20, 1872.

Specification of WALTER JAMES TURNER, engineer, of Bradford, York county, England. Improvements in the Manufacture of Bisulphites, and in the means or apparatus employed therein, and in the application of the same to bleaching and preparing for dyeing or printing textile fabrics and fibers.

This invention consists in improved machinery or apparatus for the manufacture of bisulphites, and in the application of the same to bleaching and preparing for dyeing or printing textile fabrics and fibers, whereby brighter and more even colors are obtained than by the present processes.

To make my invention better understood, I will proceed to describe the same by reference to the accompanying drawing, in which—

Figure 1 is a sectional elevation of my improved machinery or apparatus for the manufacture of bisulphites, and Fig. 2 plan of the same.

In said drawing, *a* is a double-acting blast-engine. *e* is the side chamber to the cylinder of said engine. *e e* are the eduction-valves of the engine. *e<sup>2</sup>* is a pipe connecting the side chamber *e* of the engine with the air-reservoir *ff f*, which rises from its connection with the chamber of the retort *h*. *i* is a door or man-hole in the top of said retort. *h<sup>2</sup>* is the feeding-door of the retort, and *h<sup>3</sup>* is a screw attachment to said door, arranged in such a manner as to enable the same to be hermetically closed. *u* is the fire-door to furnace under the retort. *w* is the brick-work, and *w<sup>2</sup>* is the flue leading to the chimney. *j* is a strainer placed over the aperture in the retort *h* that opens into the curved pipe *l*, which forms the connection between the retort and the coil of still-pipe *m* located in the cooling-tank *n*. *p* is a pipe leading from the coil of still-pipe *m* into the bottom of the receiver *q*. The receiver *q* is formed with steps leading to the lowest portion thereof, and is usually made of wood and lined with lead. The space within said receiver is partially divided by a series of partitions, *r r*, descending from above to within a short distance of the steps *r r*, which partitions facilitate the more perfect mingling of the gases with the potash, soda, or ammonia, which are to be placed in said receiver. The pipe *s*, leading from the receiver *q*, allows the carbonic-acid gas to escape therefrom into the

atmosphere. A cistern or tank, *t*, placed over the receiver *q*, has a valved connection with a smaller cistern, *x*, placed at its side, and also has a valved or stop-cock connection with a steam-generator. The valve *z* closes the connection between the small tank *x* and the receiver *q*.

Any suitable air-blown machinery may be employed, in combination with the other portions of the above-described apparatus, for producing the desired blast.

The following is the method of operating my improved manufacture: Carbonate of soda, potash, or ammonia is placed in the cistern *t* with the requisite quantity of water to dissolve the same when aided by steam let into said cistern. The solution is then allowed to run through the small cistern *x* into the receiver *q*. The bottom of the retort *h*, having been raised to a high temperature by the fire made under the same, now receives a charge of sulphur, and instantly thereafter the feeding-door *h<sup>2</sup>* of the retort is securely closed, and the blast-engine is put in motion. The current of air from the blast-engine passes through the chamber *e* and the pipe *e<sup>2</sup>* into the air-reservoir, which is divided by the perforated horizontal partitions *g g g* into the compartments *f f f*. The perforations in the partitions *g g g* are not placed vertically under each other, and consequently the air is somewhat retarded in its passage through said reservoir, and to such an extent as to produce an elevation of its temperature, and prevent the injurious effects that would result from the direct and violent impingement of the air upon the sulphur in the retort. The same effect, however, can be produced by arranging the perforated partitions *g g g* in a vertical position within the air-reservoir *f*. The volume of air thus thrown into the retort mingling with the vaporized sulphur therein, sulphurous-acid gas is produced, and is forced forward through the water-cooled curved pipe *l* into the coil of still-pipe *m*, and thence through the pipe *p* into the receiver *q*, and, there mingling with and diffusing itself throughout the solution of soda, potash, or ammonia in said receiver, nitrogen and carbonic-acid gas are at first disengaged, and are allowed to escape therefrom into the atmosphere, until such time as only pure sulphurous gases are found to escape from the

receiver. The solution is then allowed to remain in the receiver *q* until it shall attain a sufficiently low temperature, and is then drawn off into suitable vessels for use or transportation. The bisulphites thus produced—*videlicet*, bisulphite of soda, bisulphite of potash, or bisulphite of ammonia, as the case may be—may be employed for bleaching or for preparing for dyeing or printing textile fibers or fabrics in the following manner, *videlicet*: Place the textile fibers or the spun or woven articles, after having been subjected to the ordinary cleansing process, in a cistern containing a bath composed of a mixture of either of the afore-mentioned bisulphites with water, and allow the same to remain for a sufficient length of time to produce the desired effect. The said bisulphites can be used in the process of bleaching or in the preparation for the dyeing of silk, flax, straw, China grass, jute, and also of the thick white hairs formed in some wools called "kemp."

Sulphuric acid can also be obtained by the use of the afore-described apparatus by forcing the sulphurous acids into the receiver, or by forcing the same mixed with air, steam, or oxygen into a heated tube containing platinum. In the first case anhydrous sulphuric acid will be obtained, and in the second hydrated sulphuric acid will be the result.

I claim as my invention—

1. The combination of the perforated partitions *g* with the air-reservoir *f*, substantially as and for the purpose herein described.

2. The combination of the blast-engine with the retort *h* through the medium of the chambered air-reservoir *f*, substantially as and for the purpose herein set forth.

3. The combination of the descending partial partitions *r* with the receiver *q*, substantially as and for the purpose herein set forth.

4. The combination of the blast-engine with the retort *h* and the receiver *q*, substantially as and for the purpose herein set forth.

5. The combination of the cisterns *t* and *x* with each other and with the receiver *q*, substantially as and for the purpose herein set forth.

6. The within-described process of producing bisulphites for bleaching and other purposes in an apparatus composed of the blast-engine *a*, the chambered air-reservoir *f*, the retort *h*, the still-pipe *m*, the receiver *q*, and the cisterns *t* and *x*, when arranged substantially as herein set forth.

In testimony of this, my application for Letters Patent from the Government of the United States "for improvements in the manufacture of bisulphites, and in the means or apparatus employed therein, and in the application of the same to bleaching and preparing for dyeing or printing textile fabrics and fibers," I hereunto subscribe my name.

WALTER JAMES TURNER.

Witnesses:

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