J. A. McClelland.

Pyroxyline.

No. 90,766. Patented Jun. 1, 1869.

Fig. 1.

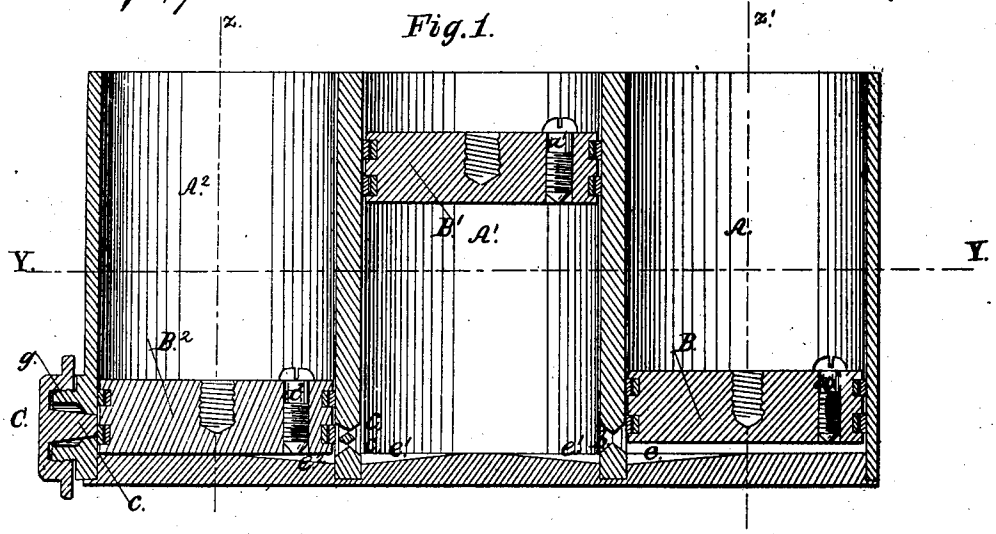


Fig. 2.

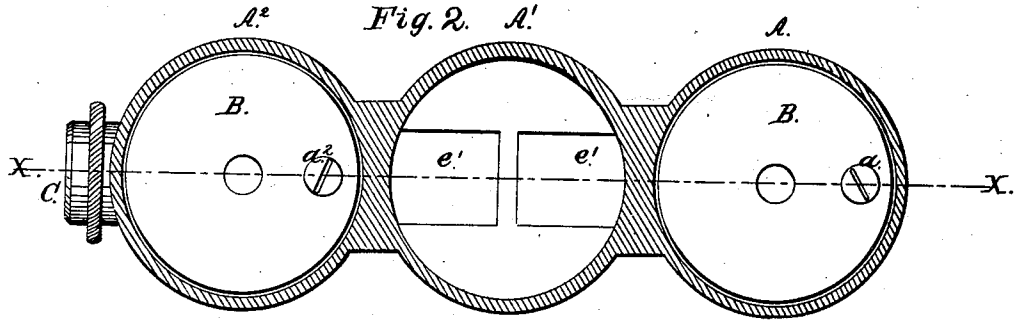


Fig. 3.

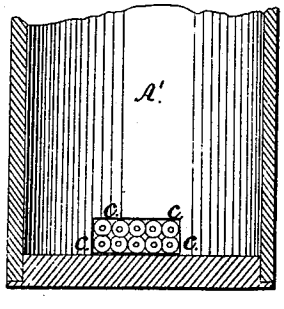


Fig. 4.

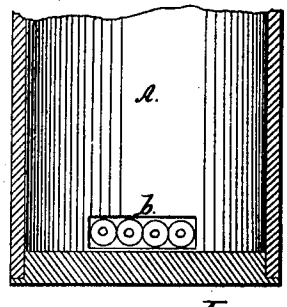
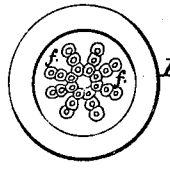


Fig. 5.



Witnesses.

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IMPROVED MACHINE FOR TREATING COLLODION AND ITS COMPOUN

Specification forming part of Letters Patent No. **90,766**, dated June 1, 1869.

To all whom it may concern:

Be it known that I, JOHN A. McCLELLAND, of Louisville, in the county of Jefferson and State of Kentucky, have invented a Machine for Treating Collodion and its Compounds; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a longitudinal section taken in a vertical plane through the machine. Fig. 2 is a section through the machine, taken in the horizontal plane indicated by line *y y* in Fig. 1. Fig. 3 is a cross-section through the machine, taken in the vertical plane indicated by line *z z*, Fig. 1. Fig. 4 is a cross-section taken in the vertical plane *z' z'*, Fig. 1. Fig. 5 is an end view of a perforated rose-nozzle, adapted for delivering the collodion or its compounds in fine streams from the machine.

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

This invention relates to a new and useful improvement in the treatment of soluble vegetable fiber or matter with its solvents, combined or uncombined with resins, gums, balsams, oils, coloring matters, and other substances, for the production of a homogeneous plastic molding compound, which is adapted for the manufacture of useful and ornamental articles, and also for coating or covering various objects.

The object of my invention is to provide for excluding air, as far as practicable, from the mixing chamber or chambers during the process of preparing collodion and its compounds, for the purpose of preventing the escape of the volatile solvents during the mixing of the substances, and also for the further purpose of producing the compound free from air.

To enable others skilled in the art to understand my invention I will describe the best means known to me for carrying it into effect.

In the accompanying drawings, A A^1 A^2 represent three upright vessels of any suitable capacity, which are preferably made of metal of cylindrical form, and with open tops and closed bottoms. These three vessels are bored out truly and adapted for receiving in them movable pistons or plungers B B^1 B^2, which may be worked by any suitable means. In order to insure the close fitting of the pist in their respective vessels, these pistons r be provided with metallic or other suit packing applied to their peripheries, as sh in Fig. 1. Each piston is perforated and vided with a suitable valve or plug, for purpose of excluding air from the cham beneath it; or, instead of using a valve or pl means may be provided for pumping out beneath the pistons. The vessels A A^1 are united by divisions, through which an points near the bottom thereof small passa are made for the escape of the substances ing treated from one chamber into anotl The perforations or passages *b*, forming c munications between the two vessels A a A^1, are somewhat larger than those lette *c c*, which form communications between vessels A^1 and A^2.

The e passages *b* and *c* cause the s stances under treatment in said vessels separate in fine streams while passing fr one vessel into another, and consequently substances, which are in a fluid or semi-fl state, will be intimately mixed. The said p forations or reticulations are made, as sho in the drawings, so as to present sharp kn edges, which will have the effect of finely ducing or comminuting any fibrous or so particles in the compound, thereby facilit ing the reduction of these particles, and p ducing a homogeneous mixture thereof wi their solvent, and also with other substan which may be used to form the compound.

The perforations or reticulations *c c* a considerably finer than those lettered *b*, a are made so for the purpose of effecting a mo perfect division and mixing of the substanc while being treated in the two vessels A^1 than is effected between the two vessels A A^1 thereby obtaining a progressive comminuti and mixing of the ingredients forming t compound. The inclined planes *c c* c^1 c^2, form upon the inner sides of the bottoms of the r spective mixing-vessels A A^1 A^2, are design to, and will, prevent the respective pisto from resting flatly upon said sides, and w leave spaces beneath said pistons when th are down, as shown in the case of piston I Fig. 1. These inclined planes incline towa the passages forming communications betwe the vessels, as shown in Fig. 1. The vess

A^2 is provided with a discharge-aperture surrounded by a circular screw-nozzle, *g*, upon which is screwed a cap, C, having a valve or plug, *c*, formed on it, that will tightly shut said aperture against the escape or admission of air. Instead of the plug-cap C, a cap, D, (shown in Fig. 5,) may be substituted, which latter is finely perforated at *f f*, for causing the compound to issue from vessel A^2 in fine streams. If desirable, a rapidly vibrating or rotating knife or knives may be used in combination with the rose nozzle or perforated cap D, when applied to vessel A^2, and so arranged that as the attenuated streams of the compound issue from the said vessel through said cap, they will be cut into fine grains or particles, and thus prepared for the further treatment, substantially as described in my Letters Patent of the United States numbered 77,304, and dated on the 28th day of April, A. D. 1868.

It is obvious that the form of the discharge-aperture of vessel A^2 may be made different from that shown, and so that the compound may be expelled in the form of sheets and bars of various sizes; or, if desirable molds of any required pattern may be applied to the nozzle or discharge-aperture of vessel A, for molding the compound into useful or ornamental shapes as it issues from said vessel. The drawings represent three vessels united and adapted for use in the preparation and treatment of collodion and its compounds; but for some purposes two vessels will answer, and for other purposes more than three vessels may be used, and the compound passed successively from one to another, as it is more or less perfectly reduced and mixed.

The operation of the mill or machine is as follows: Cotton or other vegetable fiber, made soluble in ether and alcohol by immersing it in nitric and sulphuric acids, is put into the vessel A beneath the piston B, together with a proper quantity of its solvent. The piston B^1 is then pressed down as far as it will go, and the valve *a* in piston B opened to allow the expulsion of air beneath this piston, when it is forcibly pressed down upon the substance contained in vessel A. After piston B is depressed, and as much of the air as possible expelled from beneath it, the valve *a* is tightly shut.

Now, by alternately raising and depressing the piston B B^1, the substances will be forced from one vessel into the other through the perforations *b*. By thus alternately forcing the substances through the perforations *b* their reduction and mixture will be greatly facilitated.

When the substances have been blended and reduced as much as possible in the two vessels A A^1 the piston B is forced down upon the bottom of its vessel, and there held by any suitable means, so as to prevent the entrance of the substance which is then in vessel A^1 into vessel A. The pistons B^1 and B^2 are then worked up and down, and the substance caused to pass back and forth through the perforations *c c*, which, being smaller than the perforations *b*, will cause a more complete blending or mixing and reduction of the substances.

When the process is completed the piston B^1 is forced down upon the bottom of vessel A^1 and held there. The cap C is then removed from the discharge-nozzle, and the substance forced out of the vessel A^2 through this nozzle in the form of sheets, sticks, or fine streams.

In addition to the solvent which is added to the fiber, as above stated, gums, resins, balsams, oils, coloring matters, or other suitable substance or substances may be added, which it is required shall enter into the composition of the plastic mass to be produced.

Instead of using the pistons as cut-offs for the apertures of one vessel while working the mixture in other vessels, valves or slides working air-tight may be adopted.

It will be seen from the above description that I provide for successfully preparing collodion and its compounds in a vacuum, (more or less perfect,) and at the same time effect a thorough reduction and intimate blending of the substances used. Consequently, I obtain great economy of volatile solvents used, and produce the compound in question free from air-bubbles, and render it more dense and homogeneous, and better in every other respect than similar compounds produced under other processes.

I do not confine my invention to the precise means herein described for preparing collodion and its compounds, as other means equivalent thereto may be adopted for effecting the same result.

Having described one practical mode of carrying my invention into effect, what I claim as new, and desire to secure by Letters Patent, is—

1. The preparation of collodion and its compounds in a vacuum, substantially as and for the purposes described.

2. The combination of mixing-vessels, having pistons working air-tight therein, with reticulated or finely-perforated passages, through which the substances, while being treated, are compelled to pass, substantially as and for the purposes described.

J. A. McCLELLAND.

Witnesses:
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E. W. ANDERSON.