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B. KNIFFLER.

APPARATUS FOR DISSOLVING SIZE FOR PAPER MAKING.

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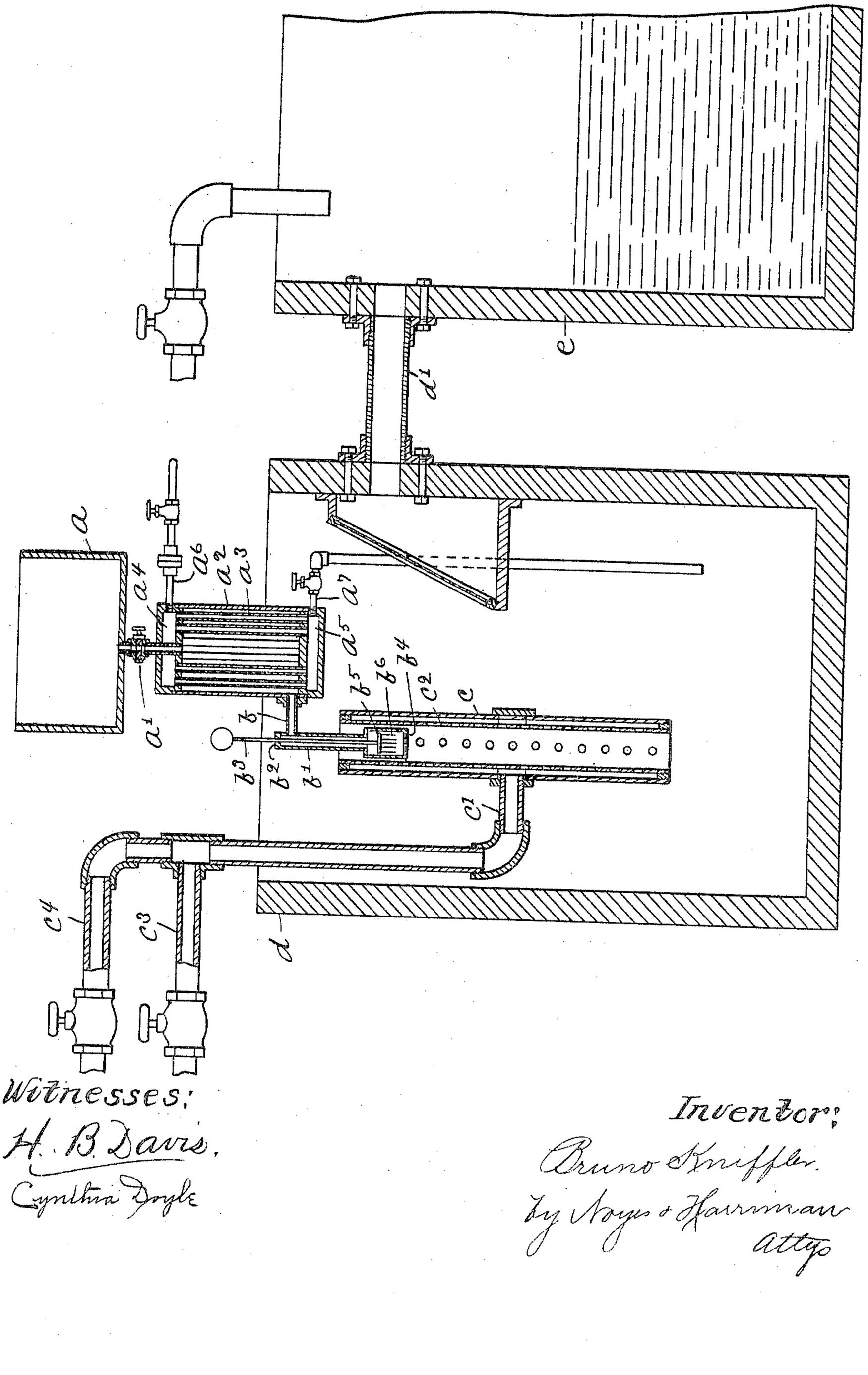

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UNITED STATES PATENT OFFICE.

BRUNO KNIFFLER, OF STONEHAM, MASSACHUSETTS.

APPARATUS FOR DISSOLVING SIZE FOR PAPER-MAKING.

No. 816,864. Specification of Letters Patent. Patented April 3, 1906.

Application filed July 7, 1905. Serial No. 268,709.

To all whom it may concern:

Be it known that I, BRUNO KNIFFLER, of Stoneham, county of Middlesex, State of Massachusetts, have invented an Improvement in Apparatus for Dissolving Size for Paper-Making, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to means for dissolving size for paper-making, and has for its object to improve and simplify the construction of the apparatus employed for this purpose, whereby a uniform and perfect emulsion may be produced on a large scale, and a size employed containing a larger percentage of free resin than the ordinary or commercial resin soap, such size being herein designated "resin size."

The invention consists, essentially, in delivering liquid size to an emulsifying-chamber in small jets or streams and in delivering hot water under pressure to said emulsifying-chamber, also in small jets or streams, which act upon the jets or streams of liquefied size and forcibly disintegrate them, thereby producing an emulsion. The emulsion thus produced passes into a suitable tank adapted to receive it. The volume of size is measured and the supply of hot water delivered to the emulsifying-chamber is regulated, so that predetermined proportions of hot water and size will be delivered to the emulsifying-chamber, and consequently the emulsion produced will consist of predetermined proportions of size and hot water. The emulsion then flows from said tank into another tank containing a measured volume of cold water, which dilutes it to the required standard.

The drawing shows in vertical section an apparatus for dissolving size for paper-making embodying this invention.

a represents a tank adapted to contain a measured volume of resin size. A pipe a' leads from the bottom of the tank a to a heating apparatus, which conducts the size thereto in order that it may be heated, and said pipe contains a valve for regulating the flow. The heating apparatus consists, essentially, of a drum a^2, containing vertical tubes a^3, which are connected at their upper and lower ends to the steam-chambers a^4 a^5, which are respectively connected with the steam-pipes a^6 a^7. The size flows into the drum a^2 around the steam-tubes and becomes heated. A pipe b leads from the lower end of the drum a^2 to a receiver b', which is closed at its upper end b^2 by a cap, through which a rod b^3 passes, and which is enlarged at its lower end portion and provided with a perforated end piece or plate b^4. The rod b^3 extends down through the receiver b', and has at its lower end a plate b^5, from the under side of which several pins b^6 project, which are adapted to be thrust into the perforations in the plate b^4 when the rod b^3 is pressed down. The pins are provided for the purpose of closing the perforations or for clearing the perforations in case they should become clogged. The liquefied size flows from the heating-drum a^2 to the receiver b' and passes through the perforations in the plate b^4 by gravity. The perforations are quite small, so that the liquefied size will be discharged in very small jets or streams. The lower end portion of the receiver b' is contained in an emulsifying-chamber.

c represents an upright tube open at both ends, which is connected to a pipe c' at a point substantially midway its length, and concentrically arranged within said tube c is a tube c^2 of lesser diameter, which is formed with perforations from end to end and which is attached at each end to the tube c. The inner perforated tube is made substantially as long as the outer tube c, and the means employed for connecting it with said outer tube closes the space between the two tubes at the ends to thereby form an annular space or chamber between the two tubes, the exits therefrom being the perforations in the inner tube c^2. The space within the inner tube c^2 serves as the emulsifying-chamber, and the lower end of the receiver b' extends down into said chamber for a short distance, being located at the upper end of the chamber. The pipe c' has connected with it a cold-water pipe c^3 and a steam-pipe c^4, and the steam enters and passes by the end of the cold-water pipe c^3 and meets the water which enters the pipe c', so that the water is heated and is forced by the steam-pressure into the circular space or chamber surrounding the emulsifying-chamber and is caused to enter the said emulsifying-chamber through the perforations in the tube c^2. The perforations in the inner tube are quite small, so that the water issues in small jets or streams, and said perforations being located in the side wall of the emulsifying-chamber said jets or streams will

be directed at right angles, or thereabouts, to the jets or streams of liquefied size discharging from the receiver b', and as a result the small jets or streams of liquefied size are disintegrated and becoming mixed with the hot water produce an emulsion, which is discharged from the lower end of the emulsifying-chamber. The emulsifying-chamber is contained in an empty tank d, so that the emulsion is discharged into said tank. The volume of hot water used will be regulated by a valve, so that a predetermined proportion of hot water will be used relative to the volume of size and an emulsion of predetermined relative proportions thus produced. The emulsion rises in the tank d until it reaches a level near the top of the emulsifying-chamber, at which point an outlet-pipe d' leads from the tank d to conduct the emulsion to another tank e, which is many times larger than the tank d and contains a measured volume of cold water. The emulsion flows freely from the tank d to the tank e. The inlet end of the outlet-pipe d' may be screened, if desired. By placing the emulsifying-chamber in the tank d the emulsion contained in said tank will be more or less agitated by the steam-pressure; but in practice the emulsifying-chamber may be located above the tank d, if desired. I prefer, however, to agitate the emulsion in the tank d, and hence extend the steam-pipe a^7 down into said tank.

In carrying out my invention the relative proportions of the emulsion contained in the tank d will be fifteen of hot water to one of size, or thereabouts, and in the tank e thirty of cold water to one of size, or thereabouts; but these proportions may be widely varied, depending on the strength of the size.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for dissolving size for paper-making, the combination of means for heating the size, an emulsifying-chamber, means for dischaging the liquefied size into said chamber in small jets or streams, means for delivering hot water under pressure to said emulsifying-chamber likewise in small jets or streams, to disintegrate the jets or streams of liquefied size and produce an emulsion, and a tank adapted to receive the emulsion which is discharged from the emulsifying-chamber, substantially as described.

2. In an apparatus for dissolving size for paper-making, the combination of means for heating the size, an emulsifying-chamber, means for discharging the liquefied size into said chamber in small jets or streams, means for delivering hot water under pressure to said emulsifying-chamber likewise in small jets or streams, to disintegrate the jets or streams of liquefied size and produce an emulsion, means for regulating the volume of hot water relative to the size, and a tank adapted to receive the emulsion which is discharged from the emulsifying-chamber, substantially as described.

3. In an apparatus for dissolving size for paper-making, the combination of means for heating the size, an emulsifying-chamber, means for discharging the liquefied size into said chamber in small jets or streams, means for delivering hot water under pressure to said emulsifying-chamber, likewise in small jets or streams, to disintegrate the jets or streams of liquefied size and produce an emulsion, and a tank containing said emulsifying-chamber which receives the emulsion which is discharged therefrom, substantially as described.

4. In an apparatus for dissolving size for paper-making, the combination of means for heating the size, an emulsifying-chamber, means for discharging the liquefied size into said chamber in small jets or streams, means for delivering hot water under pressure to said emulsifying-chamber, likewise in small jets or streams to disintegrate the jets or streams of liquefied size and produce an emulsion, and a tank adapted to receive the emulsion which is discharged from the emulsifying-chamber, having an outlet, and a tank adapted to contain cold water which is connected with said tank which receives the emulsion, substantially as described.

5. In an apparatus for dissolving size for paper-making, the combination of means for heating the size, an emulsifying-chamber, means for discharging the liquefied size into said chamber in small jets or streams, means for delivering hot water under pressure to said emulsifying-chamber, likewise in small jets or streams, which are directed at angles to the jets or streams of liquefied size which act to disintegrate them and produce an emulsion, and a tank adapted to receive the emulsion which is discharged from the emulsifying-chamber, substantially as described.

6. In an apparatus for dissolving size for paper-making, the combination of means for heating the size, a receiver for the liquefied size having a perforated discharging-plate, two concentrically-disposed tubes arranged with a space between them, the inner tube being perforated and forming an emulsifying-chamber into which the jets or streams of liquefied size from the perforated plate are discharged, means for forcing hot water into the space between said tubes and through the perforations of the inner tube into the emulsifying-chamber, which act upon and disintegrate the jets or streams of liquefied size, and a tank for receiving the emulsion thus produced, substantially as described.

7. In an apparatus for dissolving size for paper-making, the combination of two concentrically-disposed tubes arranged with a space between them, the inner tube being perforated and attached to the outer tube at

both ends, means for discharging hot water from the perforations of said inner tube in small jets or streams, means for heating the size, a receiver for the liquefied size having a perforated discharge-plate located at the upper end of said perforated tube, to discharge the liquefied size in small jets or streams into said tube, at the upper end thereof, which are acted upon and disintegrated by the jets or streams of hot water, and a tank for receiving the emulsion thus produced, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

BRUNO KNIFFLER.

Witnesses:
B. J. NOYES,
H. B. DAVIS.