

(No Model.)

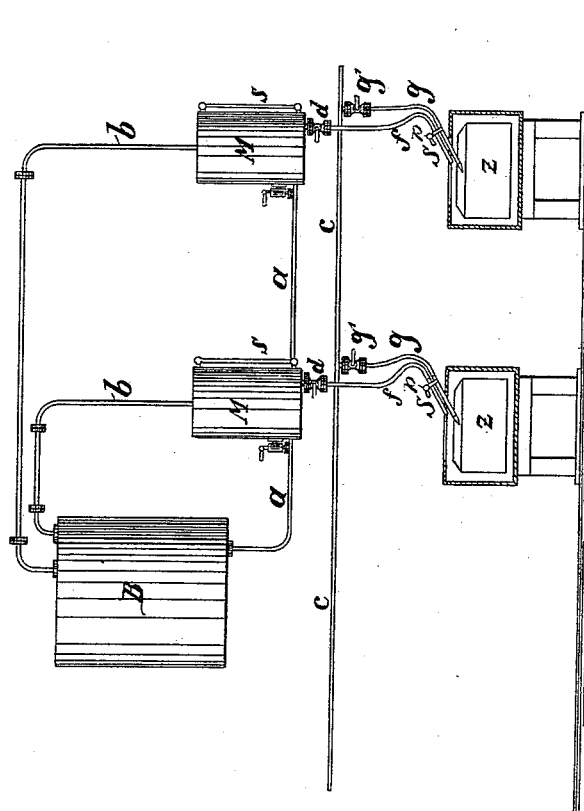
4 Sheets—Sheet 1.

A. BAUMGARTH.
APPARATUS FOR REFINING SUGAR.

No. 420,141.

Patented Jan. 28, 1890.

FIG. 1.



Witnesses:
J. Thomson Cross.
Wm. E. Roylee

Inventor.
Atwin Baumgarth.
per *Henry M. W.*
Att'y.

(No Model.)

4 Sheets—Sheet 2.

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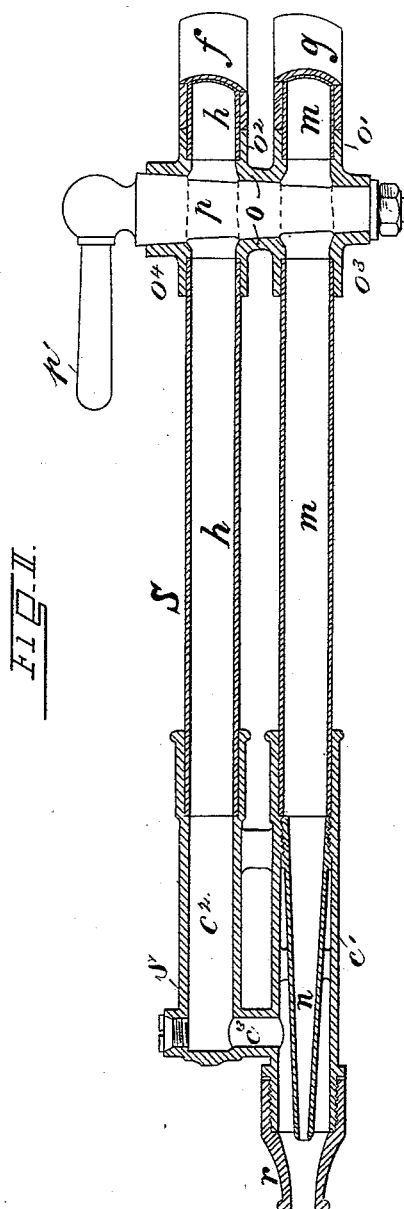


Fig. 2.

Witnesses:

J. Thomson Cross
M. E. Rogers

Inventor.

Alwin Baumgarth
per Henry O. H.
Att'y.

(No Model.)

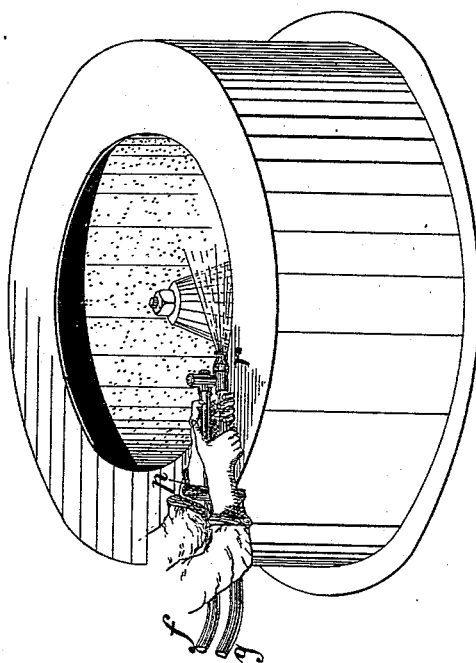
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FIG. III.



Witnesses:
J. Thomson Cross
Wm. E. Rouze

Inventor:
Alwin Baumgarth
per *Henry O. B.*
Att'y.

(No Model.)

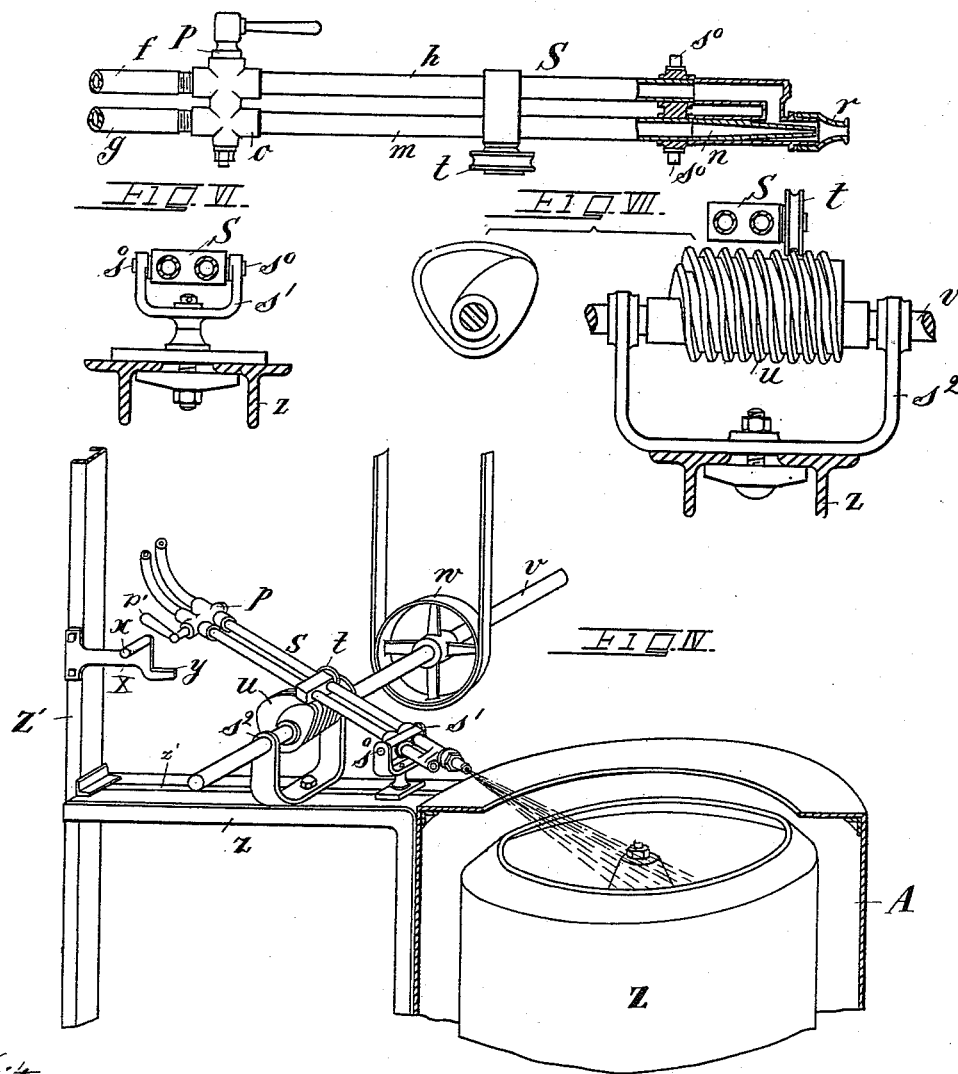
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A. BAUMGARTH.
APPARATUS FOR REFINING SUGAR.

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Patented Jan. 28, 1890.

FIG. V.



Witnesses:

J. Thomson Cross.
M. E. Rouze.

Inventor.

Alwin Baumgarth.
per Henry M. B. Alley.

UNITED STATES PATENT OFFICE.

ALWIN BAUMGARTH, OF SUDENBURG-MAGDEBURG, PRUSSIA, GERMANY.

APPARATUS FOR REFINING SUGAR.

SPECIFICATION forming part of Letters Patent No. 420,141, dated January 28, 1890.

Application filed February 11, 1889. Serial No. 299,379. (No model.) Patented in Belgium November 28, 1888, No. 84,104; in France November 28, 1888, No. 194,399; in England November 28, 1888, No. 17,339; in Italy March 31, 1889, XXII, 24,981, XLIX, 347; in Austria-Hungary May 23, 1889, No. 47,295 and No. 2,171; in Spain August 29, 1889, No. 9,777, and in Canada September 21, 1889, No. 32,361.

To all whom it may concern:

Be it known that I, ALWIN BAUMGARTH, a subject of the King of Prussia, residing at Sudenburg-Magdeburg, Prussia, German Empire, have invented certain new and useful Improvements in Apparatus for Refining Sugar, (for which I have obtained Letters Patent in the following countries: In Austria-Hungary, dated May 23, 1889, No. 47,295 and No. 2,171; in Belgium, dated November 28, 1888, No. 84,104; in France, dated November 28, 1888, No. 194,399; in Italy, dated March 31, 1889, No. 24,981, Vol. 22, and No. 347, Vol. 49; in Spain, dated August 29, 1889, No. 9,777; in Great Britain, dated November 28, 1888, No. 17,339, and in Canada, dated September 21, 1889, No. 32,361;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters or figures of reference marked thereon, which form a part of this specification.

Referring to the drawings, Figure I is a more or less schematic elevation of an apparatus for purifying raw-sugar embodying my invention. Fig. II is a longitudinal section of the atomizer or spraying device. Fig. III is an isometric view of a centrifugal drum, illustrating the mode of effecting the purification of the sugar by hand. Fig. IV is a like view illustrating the mode of and means for effecting the purification of the sugar mechanically. Fig. V is an elevation, partly in section, of the atomizer or spraying device, shown in Fig. IV. Fig. VI is a front view of the bearings for the atomizer; and Fig. VII shows, by a front and end view, respectively, the devices for imparting a vertical motion to the atomizer.

The invention relates to the art of purifying or refining sugar, and has for its object to provide means whereby the purification may be effected at a trifling expense, with a comparatively slight dissolution of sugar, and in a comparatively short time.

To these ends the invention consists in the

combination, with the usual centrifugal drum, of an atomizer or spraying device for spraying the sugar with water, or with water combined with bluing, while the drum is revolving; in the combination, with the atomizer or spraying device, of means for supplying the same with the necessary purifying agent and with the compressed air for atomizing said agent; also, in means for automatically moving the atomizer or spraying device vertically and cutting off the supply of purifying agent; also, in structural features and combinations of parts, substantially as hereinafter more fully described.

In the drawings, Z indicates the centrifugal drum, which is of any usual construction and is revolved by well-known means. There is provided for each drum a supply-tank M, from which the purifying agent is supplied to the spraying device, said supply-tanks being connected with a reservoir B by means of a pipe or pipes *a*. Each tank M has an air-exhaust pipe *b*, also connected with reservoir B, and a level-indicator *s*, the graduations of which indicate the level of the contents of said vessels M either in filling or exhausting. Each vessel M is further provided with a stop-cock *d* or valved coupling, to which is attached a flexible hose *f*, that is also connected with the branch *o'* of the barrel of a stop-cock *o*, that has four branches *o'* *o*² *o*³ *o*⁴, Fig. 2, and *c* is a pipe (connected with any suitable air-forcing apparatus or with a compressed-air reservoir) also provided with as many valved couplings *g'* as there are centrifugal drums, to each of which couplings is connected one end of a hose or flexible tube *g*, whose other end is connected with the branch *o*² of the barrel of stop-cock *p*.

S is the atomizer or spraying device-composed of two tubes *c'* *c*², which latter communicates with tube *c'* at its outer closed end by a passage *c*³. The tube *c'* extends sufficiently beyond the tube *c*² to receive the spraying-nozzle *r*, and within said tube *c'* is arranged an ejector-nozzle *n*. The tube *c'* is connected with the branch *o*³ of the barrel *o* of the stop-cock *p* by means of a tube *m*, and the tube *c*² is connected with the branch *o*⁴ of said bar-

rel by means of a pipe *h*, said stop-cock having two ports (not shown) so arranged that the communication between branches $o^2 o^4$ and branches $o^3 o'$ may be simultaneously established or cut off.

The spraying device or atomizer *S* being flexibly connected with the air-supply pipes and the tanks containing the purifying agent, it may be guided by hand, so as to spray the raw sugar in the centrifugal, as shown in Fig. 3. The air is preferably supplied to the spraying device under a pressure of about three atmospheres, and in view of the rapid mechanical action of the purifying agent and its being applied in a finely-subdivided condition but a comparatively small volume of sugar is dissolved, much less than in the mode of purification as heretofore carried out. In fact, the purification is effected in so thorough and rapid a manner that in from one and a half to two minutes seventy-five kilograms of raw sugar can be purified with an expenditure of not more than two kilograms of water, a result heretofore not attainable.

The spraying device may also be operated mechanically—that is to say, such a motion may be imparted to it by mechanical means as to effectually purify the sugar in the centrifugal—and to this end a vertical motion is imparted to the spraying-nozzle through the medium of the following instrumentalities, referring to Figs. 4 to 7. To this end a frame *z* is provided for each centrifugal, in the top of which is formed a slot *z'*. Near its outer end the spraying device *S* is provided with journals *s* that have their bearings in a swivel-bracket *s'*, adjustable in the slot *z'* by means of a nut screwed on the threaded foot of said bracket, which foot projects through slot *z'*, as more plainly shown in Fig. 6. A second swivel-bracket *s''*, likewise adjustable in slot *z'* of frame *Z*, serves as a bearing for the shaft *v* of a worm *u*, with which meshes a worm-wheel *t* on the spraying device *S*. The shaft *v* carries a belt-pulley *w*, driven from any suitable prime motor. The worm *u*, as more plainly shown in Fig. 7, is mounted eccentrically on shaft *v*, so that a vertical reciprocating motion will be imparted to the spraying-nozzle to vertically sweep the inner faces of the centrifugal, a motion which is not interfered with, since the spraying device is flexibly connected with the tank that supplies the purifying agent and with the compressed-air pipe. It will also be observed that by the described means a lateral motion is imparted to the spraying device, timed by the length of the worm from which the wheel *t* becomes disengaged after having traveled from one end to the other of said worms. On dropping off, the spraying device is tilted, its nozzle moving upward, while the coupled end of the device moves down, and in doing so the handle *p'* of the stop-cock *p* strikes against an arm *x* projecting from a bracket *X* on standard *Z'* of frame *z*, thereby cutting off the communication between the spraying de-

vice *S* and the tank *M* and air-supply pipe *c*. The bracket *X* has a second arm *y*, that serves as a holder for the coupled or rear end of the spraying device and arrests its further downward motion. It is obvious that on again lifting said rear end to bring the wheel *t* into gear with the worm *u* the handle of the stop-cock will again encounter the arm *x* on bracket *X*, and automatically open the stop-cock. To admit of the adjustment of the bearings for the worm and spraying device and yet keep the handle of the stop-cock within reach of the arm *x*, said handle is made of a sufficient length.

By means of the described automatic cut-off it will not be necessary to correctly measure the quantity of purifying-liquid supplied to the tanks for a given quantity of sugar in a centrifugal, since the supply to the spraying device is controlled by the worm; but when the spraying device is guided by hand, or when the vertical reciprocating motion of the spraying device is produced by a simple eccentric instead of the worm-eccentric, it is absolutely necessary to accurately measure the quantity of water, or water and bluing, for a given quantity of raw sugar in a centrifugal, and for this purpose I provide said vessels with a level-indicator suitably graduated to indicate the volume of liquid supplied to the tank from reservoir *B*.

By adjusting the brackets *s'* *s''* in the slot *z'* of frame *z* the motion of the spraying-nozzle may be so adjusted that the entire mass of sugar in the centrifugal *Z* will be swept by the atomizer or sprayed liquid as the centrifugal revolves.

Having now described my invention, what I claim is—

1. The combination, substantially as herein set forth, with a centrifugal machine, of an atomizer or spraying device journaled to swing in a vertical plane, for the purpose specified.

2. The combination, substantially as herein set forth, with a centrifugal machine and an atomizer or spraying device journaled in bearings to swing in a vertical plane, of an eccentric operating to impart to the spraying-nozzle a reciprocating motion in said plane, for the purpose specified.

3. The combination, substantially as herein set forth, with a centrifugal machine, a spraying device journaled to swing in a vertical plane, and a worm-wheel mounted on said spraying device, of a revoluble worm mounted eccentrically on its shaft and adapted to gear with the worm-wheel of the spraying device, for the purposes specified.

4. The combination, substantially as herein described, with a centrifugal machine, a spraying device journaled to swing in a vertical plane and provided at one end with a stop-cock, of an abutment in the path of the handle or lever of the stop-cock, for the purposes specified.

5. The combination, substantially as de-

scribed, with a centrifugal machine, a spraying device journaled to swing in a vertical plane and provided at one end with a stop-cock, of an abutment in the path of the handle or lever of the stop-cock, and a rest arranged in a plane below the abutment to limit the downward movement of the spraying device and support one end thereof, for the purposes specified.

6. The combination, substantially as herein described, with a centrifugal machine, of a spraying device provided with journals, a bearing in which said device is journaled to swing in a vertical plane, said bearing being adjustable on its support toward and from the centrifugal machine, and mechanism, such as described, for imparting a vertical reciprocating motion to said spraying device, for the purpose specified.

7. The combination, substantially as herein described, with a centrifugal machine, a spraying device, swiveled bearings in which said device is journaled to swing in a vertical plane, said bearings being adjustable toward and from the centrifugal machine, of a revolvable eccentric for imparting a vertical reciprocating motion to the spraying device and bearings for the shaft of said eccentric, said bearings being likewise adjustable toward and from the centrifugal machine, substantially as and for the purposes specified.

8. The combination, substantially as herein set forth, with a centrifugal machine, a spraying device journaled to swing in a vertical plane, and mechanism, such as described, for imparting to said device a reciprocating motion in said plane, of a reservoir for the purifying agent, a measuring-tank connected with the reservoir, a flexible connection between said reservoir and the spraying device, a com-

pressed-air-supply pipe, and a flexible connection between said pipe and the spraying device, for the purpose specified.

9. The combination, substantially as herein described, with a centrifugal machine, a tank for the purifying agent, and a compressed-air-supply pipe, of a spraying device comprising an air-pipe and nozzle, a spraying or discharge nozzle, a pipe for the purifying agent connected at its outer end with the air-pipe, a four-branch stop-cock, to two of the branches of which said air-pipe and pipe for the purifying agent are connected, and flexible connections connected with the other two branches of the stop-cock and with a compressed-air-supply pipe and a tank for the purifying agent, respectively, said stop-cock operating to simultaneously admit or cut off the supply of compressed air and purifying agent to the respective pipes of the spraying device.

10. The combination, substantially as herein described, with a centrifugal machine, a spraying device operating to project a spray of liquid upon the sugar in said machine, and a compressed-air-supply pipe connected with said spraying device, of a reservoir for the purifying agent, a measuring-tank connected therewith and with the spraying device and provided with suitable volumetric indices, and an air-exhaust pipe connecting the upper end of the measuring-tank with the corresponding end of the reservoir, substantially as and for the purposes specified.

In testimony whereof I affix my signature in presence of two witnesses.

ALWIN BAUMGARTH.

Witnesses:

B. ROI,

ADOLF DEMELINS.