

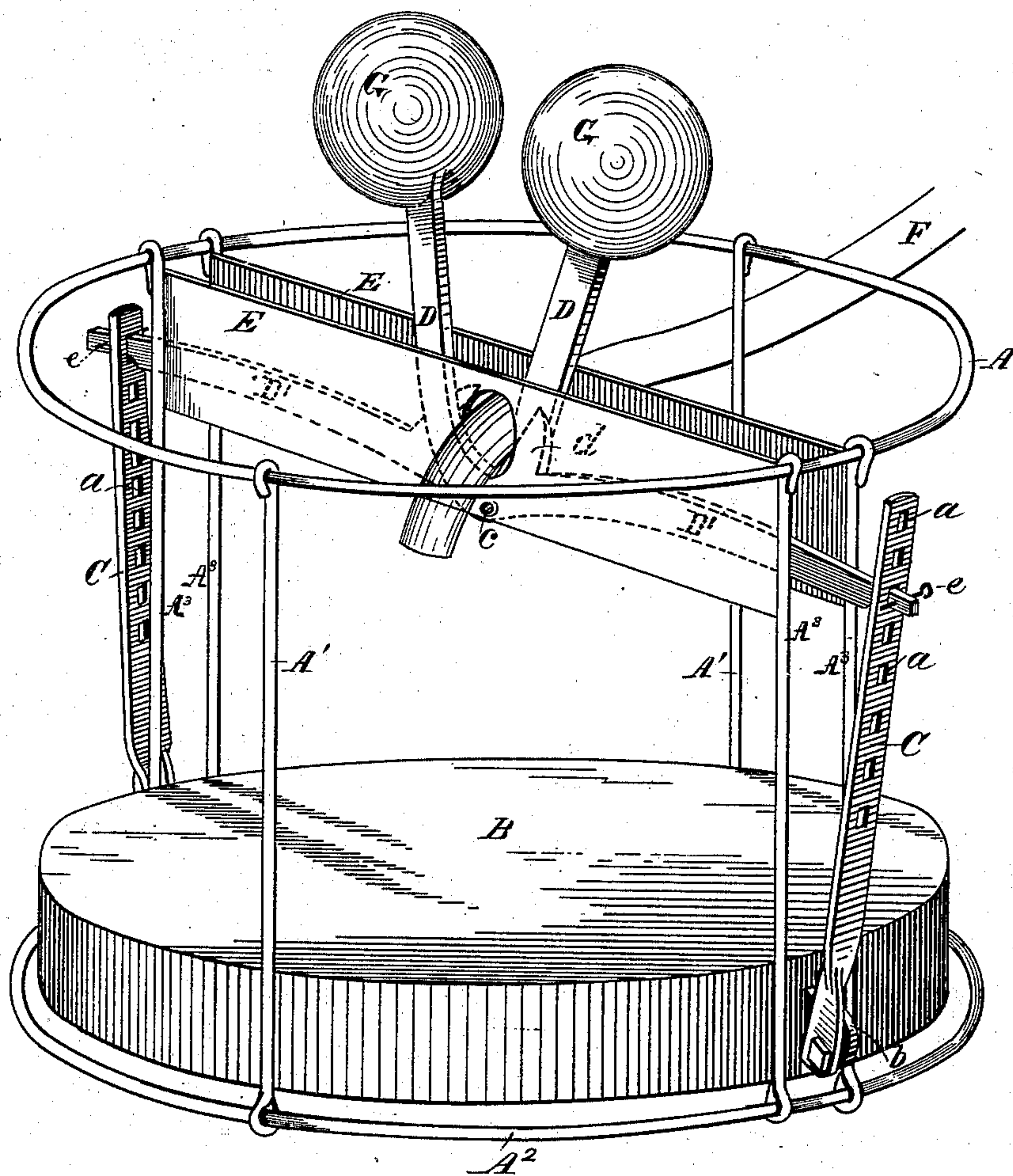
(No Model.)

M. C. BARDEN.

AUTOMATIC SAP FEEDING APPARATUS.

No. 255,565.

Patented Mar. 28, 1882.



Witnesses.
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UNITED STATES PATENT OFFICE.

MERRITT C. BARDEN, OF PAWLET, VERMONT.

AUTOMATIC SAP-FEEDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 255,565, dated March 28, 1882.

Application filed October 13, 1881. (No model.)

To all whom it may concern :

Be it known that I, MERRITT CLARK BARDEN, of Pawlet, in the county of Rutland and State of Vermont, a citizen of the United States, have invented certain new and useful Improvements in Sap-Feeders, of which the following is a specification.

My invention relates to apparatus for evaporating sap for the purpose of manufacturing maple sirup and sugar; and it consists in a device for automatically supplying the evaporating-pan with fresh sap whenever the level of fluid in the pan falls below a fixed point, said device being capable of adjustment in such manner that it will open the supply-tube at any given or desired point, thereby avoiding the danger of the treacle being scorched in the pan and greatly diminishing the labor and care involved in evaporating the sap to the required point.

Referring to the drawing forming part of this application, the figure is a perspective view, showing my automatic sap-feeder, the evaporating apparatus and the receiving-tank for the fresh sap not being shown.

A in said drawing indicates a circular frame, which may be made of strong iron wire. At any suitable distance below is placed a second and similar frame, A², which is connected to the frame A by uprights A'. At two points directly opposite each other are placed vertical guide-pieces A³, arranged in pairs in the manner shown. A flat plate, E, connects each guide-piece with the corresponding piece diametrically opposite.

Within the space inclosed by the frames A and A² and the uprights A' is placed a float, B, which in this instance consists of a hollow drum or cylinder constructed of tin or any other suitable metal. An ear or lug, b, is attached to the periphery of this float, and a second ear is attached at a point diametrically opposite. To each of these ears b is secured one end of an arm, C, the attachment of said arm being such that it has a limited pivotal motion in a vertical plane radiating from the center of the float B. These arms C are each provided with apertures a a, arranged in the manner shown, for a purpose presently to be described.

Between the two flat plates E, I pivot two levers, D D, each having substantially the form of a bell-crank, and both being pivoted to the supporting-plates by the same pivot-bolt c, which passes through each lever at or near the angle formed by its long and its short arm. The longer arms extend in opposite directions, and are of sufficient length, so that their extremities engage with the arms C by entering the apertures a formed in said arms, a pin, e, being passed through a hole in the end of the lever-arm to retain it in place. When thus arranged it will be seen that the longer arms of the levers D D are nearly horizontal, while the shorter arms vary but a few degrees from a vertical position.

Upon the upper side of the long arm of each lever D is formed a spur or projection, d. (Shown in broken lines in the drawing.) These spurs or projections d are so arranged that when the levers D are pivoted at the point c said spurs stand one upon each side of the pivotal point. Moreover, when the long arms of the levers D are horizontal, or nearly so, these spurs will be separated by a space sufficient to permit the supply pipe or tube F to lie between them. One end of this pipe F is connected with a large receiving-tank, of any suitable kind, placed so that its bottom is a little above the level of the evaporating-pan, in order that the sap may easily flow from one to the other. The other end of this tube is carried through suitable apertures in the plates E, so located that that portion of the tube between the plates E shall rest in the angles of the levers D and between the spurs d.

Now, it is evident from the construction and arrangement of parts already described that when the long arms of the levers D are raised the shorter or vertical arms will be caused to separate from each other, and the spurs or projections d will be driven together, thereby compressing the tube F between them to a degree exactly proportioned to the height to which the extremities of the long arms D' are raised. On the other hand, the moment the ends of the arms D' descend the spurs d will begin to separate, and their pressure upon the elastic tube F being thereby removed, or par-

tially removed, according to the degree of motion imparted to the arms D', the tube F will be correspondingly opened.

My invention, therefore, operates as follows:

5 The sap-feeder, organized in the manner set forth, is simply placed in any part of the evaporating-pan, the supporting-frame A² resting upon the bottom of said pan, which is then filled with sap to the proper amount, what-
10 ever that may be. The float B rests upon the sap in the pan and is buoyed up by it until, when the pan is filled, the float rises high enough to wholly close the supply-tube F. Heat being now applied to the pan in the usual
15 manner evaporation begins, and after this process has continued a short time the level of the sap in the pan is sensibly lowered, thereby permitting the float B to descend and opening the supply-tube to a corresponding degree.
20 A flow of sap takes place at once from the receiving-tank, and continues until the fluid in the evaporating-pan reaches its full height, when the float B is again raised to such a height as to close the supply-tube and cut off
25 all further discharge of sap. This operation is repeated until many gallons of sap have been discharged into the evaporating-pan and until the fluid therein has assumed the consistency of sirup. As the process continues
30 until it approaches the point where crystallization will take place at ordinary temperatures the attention of an operator will be necessary to prevent the sirup from scorching, and also to maintain such a degree of heat as to obtain
35 the greatest percentage of crystallizable liquor or sirup; but until this point is reached my invention will feed the evaporating pan, will effectually prevent all danger from burning, and wholly obviates the necessity of employ-
40 ing an assistant to watch the process and supply fresh sap to the pan as fast as required. Moreover, even where such assistance is available, without expense my sap-feeder will obviate all danger arising from carelessness, want
45 of experience, or mistakes in judgement upon the part of the person in charge.

In order to adapt my invention to be used with an evaporating-pan of any depth, I construct the arms C of such length that I am
50 able to form in each one a series of apertures, *a a*, any one of which is adapted to receive the extremity of the lever-arm D'.

It is evident that when the feeder is used in a shallow pan the lever-arms may be connected with one of the apertures near the free
55 extremity of the arm C. On the other hand, by connecting them to the arms C at a point nearer the float B the feeder will be adapted for use in a correspondingly deeper pan. In
60 the same manner the feeder may be adjusted or gaged to feed at any depth required without regard to the depth of the pan.

The vertical arms of the bell-cranks D D may be weighted, as shown at G G, to balance the weight of the float B. If desired,
65 the float may also be weighted at the center,

and said weight may be made detachable, so that it may either be removed entirely or a different weight substituted. Moreover, instead of the uprights A' A', which connect
70 the upper and lower frames, A and A², I may substitute a single vertical plate of tin or any other suitable metal, which entirely incloses the sides, leaving the frame open at top and bottom, and having narrow slots cut therein
75 to permit the action of the arms C and lever-arms D'.

By this invention I obtain an extremely cheap, simple, and effective device for feeding automatically the evaporating-pans in the
80 process of manufacturing maple sugar and sirup. To those familiar with this art it is well known that the loss of a considerable percentage of sugar is not infrequent, owing to momentary carelessness, inattention, or to mis-
85 takes in judgment. It is safe to say that nearly all, if not all, these accidents might be avoided by the use of an automatic apparatus so simple, so accurate and effective in operation, and so cheap as to be within the reach of every
90 person.

In the drawing, the elastic supply-tube is shown passing under the upper part of the frame A. It may be found more convenient to carry said tube above the frame, which will
95 form a partial support for the same.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In an automatic sap-feeding apparatus,
100 the combination, with a float, of pivoted arms adjustably connected with said float and a supply-tube leading from a reservoir and passing between said pivoted arms, said tube being constructed wholly or in part of elastic material and adapted to be opened by the descent
105 of the float and closed by its ascent, substantially in the manner, and for the purposes set forth.

2. In an automatic sap-feeding apparatus,
110 the combination, with a rising-and-falling float, of two lever-arms pivoted upon the same bolt, each having formed thereon a spur or projection, between which the supply-pipe passes, and arms pivoted to said float and adapted to
115 engage adjustably with the extremities of the said lever-arms, all substantially as and for the purposes set forth.

3. The combination, with a suitable frame having transverse supports E, of the lever-
120 arms D D, having each a long arm, D', said lever-arms being pivoted at a common point, *c*, and the pivoted arms C, substantially as and for the purposes set forth.

4. As a new article of manufacture, an automatic sap-feeding apparatus consisting of a
125 suitable supporting-frame having transverse plates E E, two bell-crank levers, D D D' D', pivoted to a common point between said plates E E, and having spurs or projections *d*, a supply-tube passing through the plates E and between the spurs or projections *d d*, and arms
130

C, having apertures *a a a*, adapted to engage with the extremities of the lever-arms, the latter being provided with weights G G, substantially as and for the purposes set forth.

- 5 5. The combination, in an automatic sap-feeding apparatus, of pivoted compressing-arms, an elastic supply-tube, and a rising-and-falling float, whereby said arms are operated, substantially as and for the purposes set forth.

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

MERRITT CLARK BARDEN.

Witnesses:

HOVEE BARDEN,
LORAN F. SHELDON.