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J. RIGNEY.

APPARATUS FOR EXTRACTING SUGAR JUICE.

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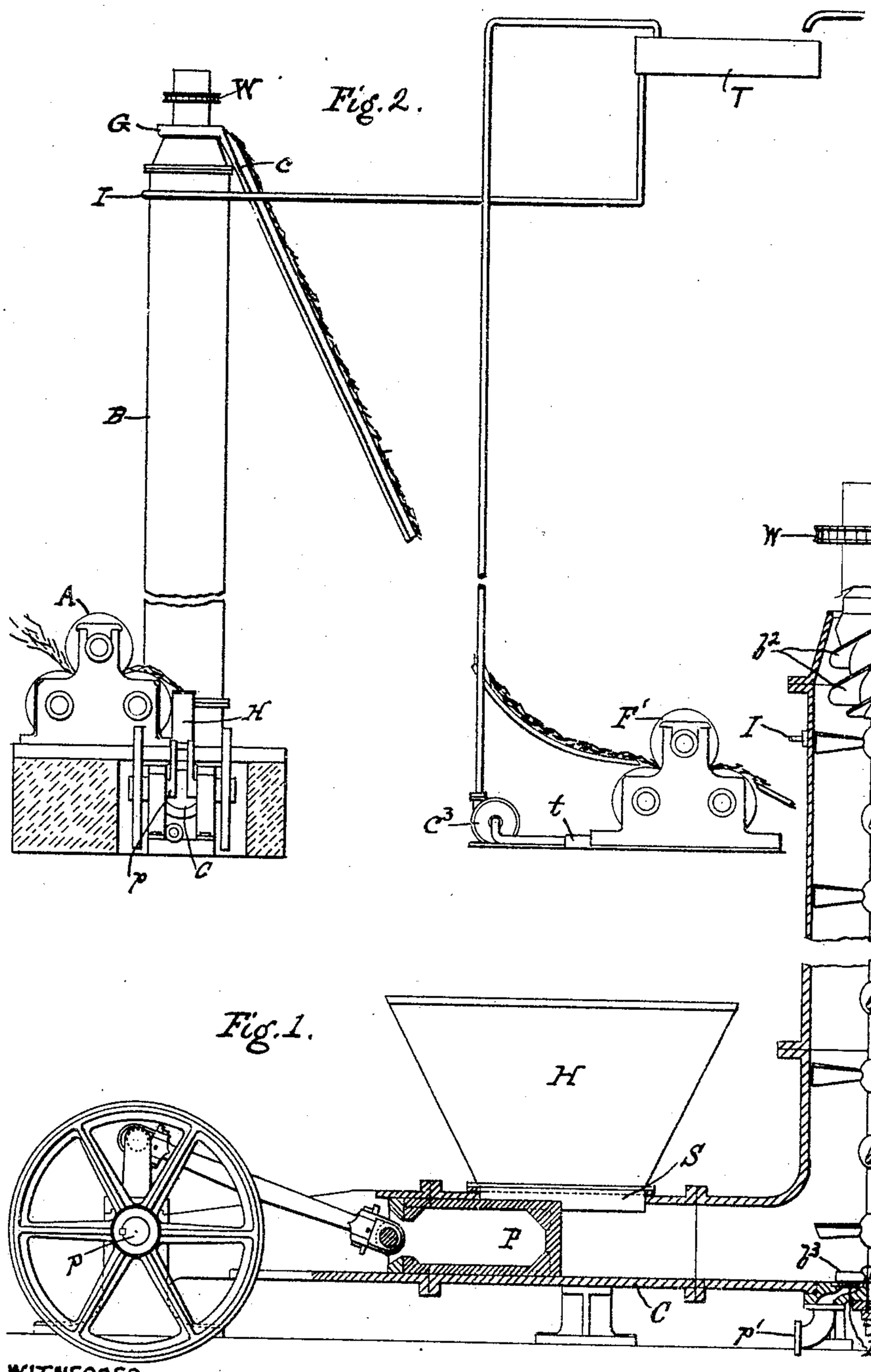

Fig. 2.

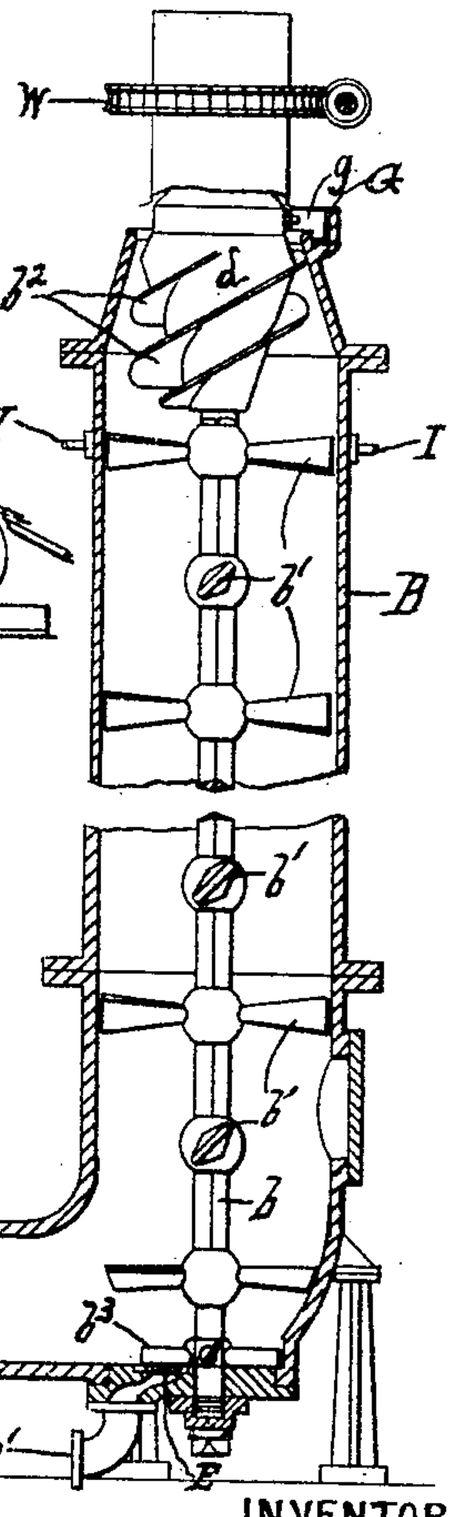

Fig. 1.

WITNESSES

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UNITED STATES PATENT OFFICE.

JOSEPH RIGNEY, OF NEW YORK, N. Y.

APPARATUS FOR EXTRACTING SUGAR-JUICE.

SPECIFICATION forming part of Letters Patent No. 786,154, dated March 28, 1905.

Application filed September 23, 1904. Serial No. 225,643.

To all whom it may concern:

Be it known that I, JOSEPH RIGNEY, a citizen of the United States of America, residing in the borough of Brooklyn, city of New York, in the county of Kings and State of New York, have invented an Improved Apparatus for Extracting Sugar-Juice from Cane or the Like, of which the following is a specification.

The object of my invention is to provide improved apparatus for increasing the percentage of sugar recovered from sugar-cane or the like; and it consists, essentially, in the improved construction and location of apparatus for agitating the bagasse in the presence of water as it comes from the crushing-rolls, and thus mechanically washing it and extracting the sugar-juice by diffusion. This is successfully accomplished by the aid of mechanism for feeding the bagasse to and through a long channel-like washing-chamber, means for supplying water and causing it to flow through the bagasse in a direction contrary to the direction of advance of the bagasse, and means for opening out the bagasse to prevent it forming an impenetrable mass in the washing-chamber as said bagasse is advanced therethrough, thus permitting the water to readily percolate through the material to wash it and carry off the sugar-juice, to be afterward separated therefrom.

In the accompanying drawings, Figure 1 is a sectional side elevation of the washing-chamber of my invention; and Fig. 2 is a side elevation of the same, drawn to a reduced scale, showing the crushing-rolls, piping, and tank.

As shown in the drawings, A is the set of crushing-rolls for crushing out the great percentage of the juice in the cane.

B is a vertical stand-pipe.

C is a short horizontal cylindrical member communicating with the bottom of the stand-pipe, and P is a solid-ended piston fitting within said cylindrical member and suitably reciprocated from a crank-shaft p. The top wall of the horizontal member is provided with a long narrow slot S, above which slot a hopper H is located. The slot S has its longest dimension parallel with the axes of the crushing-rolls A to enable the rolls to deliver the bagasse in a sheet to the interior of the member C.

On the center line of the channel or stand-pipe B a vertical shaft b is stepped, provided at suitable distances along its length with propeller-like or pitched blades b'. Scraper-blades b^3 are secured at the lower end of the shaft, which bear upon the interior surface at the bottom of the stand-pipe. Beneath the path of travel of the scraper-blades b^3 there is an outlet-pipe p', with its inlet-surface protected by a screening-plate E.

The upper end of the stand-pipe is contracted, and through the open end thereof the shaft b projects, a worm-wheel W or other suitable gear being supplied to give it rotation. Just within the contracted upper end of the stand-pipe there is secured to the shaft b a cone-shaped squeezing-screw b^2. Below this squeezing-screw b^2 there are located a number of water-inlets I, which may be supplied from a tank T. A projecting blade g on the screw b^2, traveling in a channel G at the top of the stand-pipe, serves to guide all bagasse discharged from the annular opening left at the upper end of the stand-pipe to an inclined chute c, by which the bagasse may be fed to a second set of rolls F', which express the liquid from the bagasse into a trough t beneath the rolls, from which it may be pumped by a pump c^3 to a tank T to be either treated with lime to neutralize it or not, as may be necessary, and this juice may thence be returned to the inlets I in the upper part of the stand-pipe.

The water may be allowed to stand in the stand-pipe up to a level below the top of the hopper H. The rolls A are caused to deliver their sheet of bagasse to the interior of the cylindrical member C, which material is advanced from time to time as new material is admitted and forced forward by the piston until the whole space between the hopper-opening and the bladed shaft b is packed with the bagasse and a dam made thereby to prevent liquid from running out through the hopper. If desired, the level of the water can now be raised within the stand-pipe; but it will not be found necessary to do so in many cases.

The shaft b is given a motion to cause the

lower pitched blades below the water-level to agitate the bagasse as it is forced into the lower part of the stand-pipe and to cause it to be thoroughly washed for the extraction of the juice. At the same time the blades feed the bagasse upward through the stand-pipe and break the bagasse up to present a more or less loose mass of advancing bagasse to the percolating and diffusing action of the water admitted at the inlets I. A substantially cylindrical loosened mass of bagasse reaches the upper contracted end of the stand-pipe, where much of the liquid taken up by the bagasse in its travel is squeezed out to fall down upon and through the bagasse advancing toward it. The bagasse is delivered from the top of the stand-pipe as a more or less broken cylinder of felted bagasse and still contains a certain quantity of water and a small portion of sugar-juice, varying greatly under different conditions. The bagasse is broken away from its cylindrical form and guided to the chute *c*, by which it is fed to the rolls F, which express almost all the liquid from it. The bagasse from these rolls may be thrown aside and dried and then used for fuel in the ordinary manner, while the liquid expressed from the mass is returned to the tank T for the use before described.

I claim as my invention—

1. Apparatus for extracting juice from bagasse or the like, comprising a stand-pipe provided with water-inlets near the upper part and a screened outlet for liquid near the bottom, a rotary shaft in the stand-pipe, carrying a series of pitched blades adapted to advance the material up through the stand-pipe as a loosened mass, a scraper-blade on the shaft adapted to clean the screened outlet and means for feeding the material to the lower part of the stand-pipe.

2. Apparatus for extracting juice from bagasse or the like, comprising a stand-pipe provided with water-inlets near the top and an outlet for liquid near the bottom, a rotary shaft in the stand-pipe, carrying a series of pitched blades adapted to advance the material up through the stand-pipe as a loosened mass in combination with a cone-shaped squeezing-screw on the upper end of the shaft at the outlet leaving an annular discharge-opening, as and for the purpose described.

3. Apparatus for extracting juice from bagasse or the like, comprising a stand-pipe, a shaft therethrough with a number of pitched blades thereon of such a number and pitch as to advance the material slowly up through the stand-pipe as a loosened mass, the stand-pipe having water-inlets near the top of the stand-pipe and an outlet for the liquid near the bottom thereof, in combination with a short horizontal member open to said stand-pipe, a solid-ended piston therefor and a hopper in the wall of said member.

4. Apparatus for extracting juice from bagasse or the like, comprising a stand-pipe, a shaft therethrough with a number of pitched blades thereon of such a number and pitch as to advance the material slowly up through the stand-pipe as a loosened mass, the stand-pipe having water-inlets near the top of the stand-pipe and a liquid-outlet at the bottom thereof, in combination with a short horizontal member open to said stand-pipe, a solid-ended piston therefor and a hopper in the wall of said member, adjacent to the shaft, a screen for said outlet, and a scraper-blade on the shaft adapted to clean said screen.

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

JOSEPH RIGNEY.

Witnesses:
HUBERT HOWSON,
F. WARREN WRIGHT.