A. WERTENBRUCH.

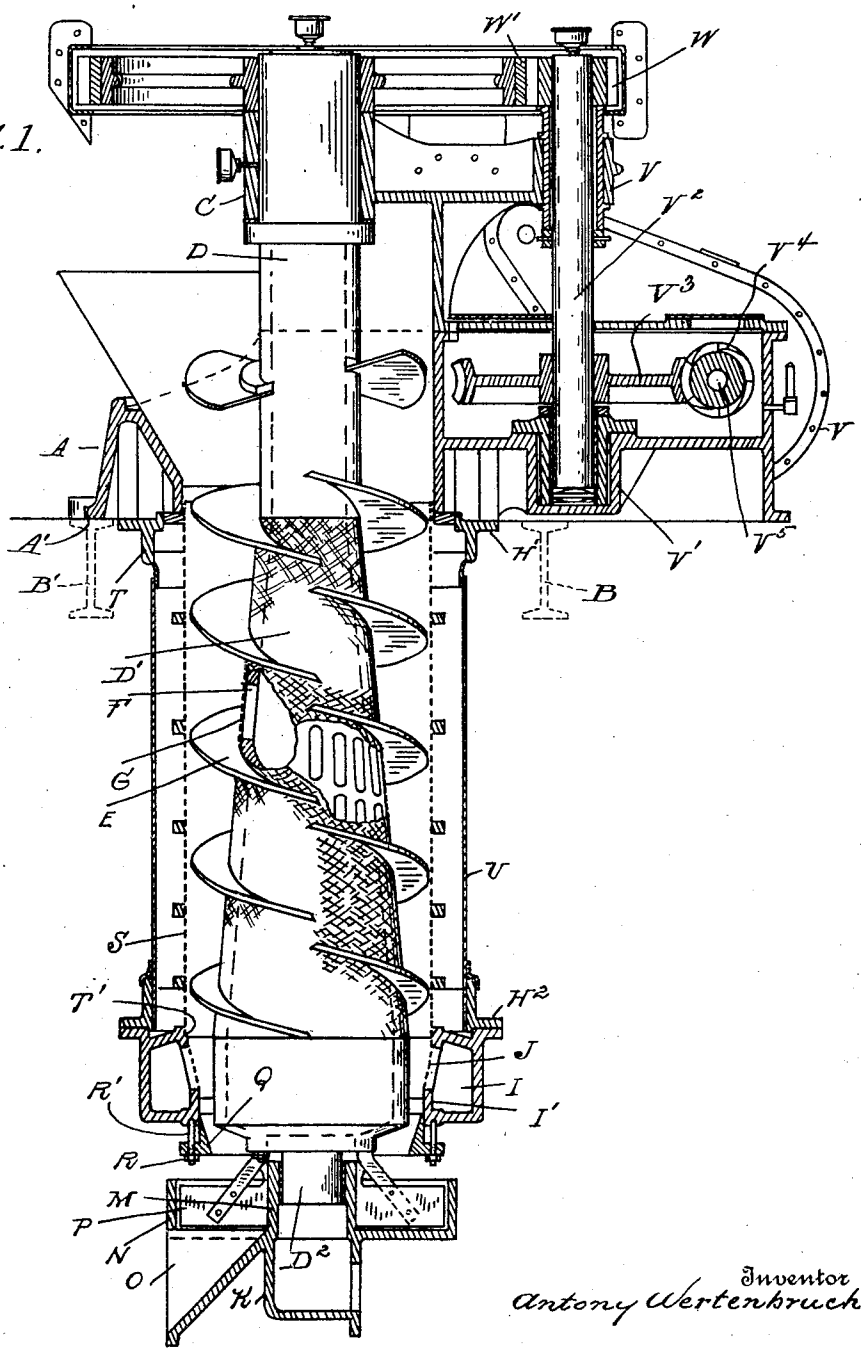
PULP PRESS.

APPLICATION FILED DEC. 22, 1916. RENEWED AUG. 11, 1920.

1,354,528. **Patented Oct. 5, 1920.**

2 SHEETS—SHEET 1.

Fig. 1.



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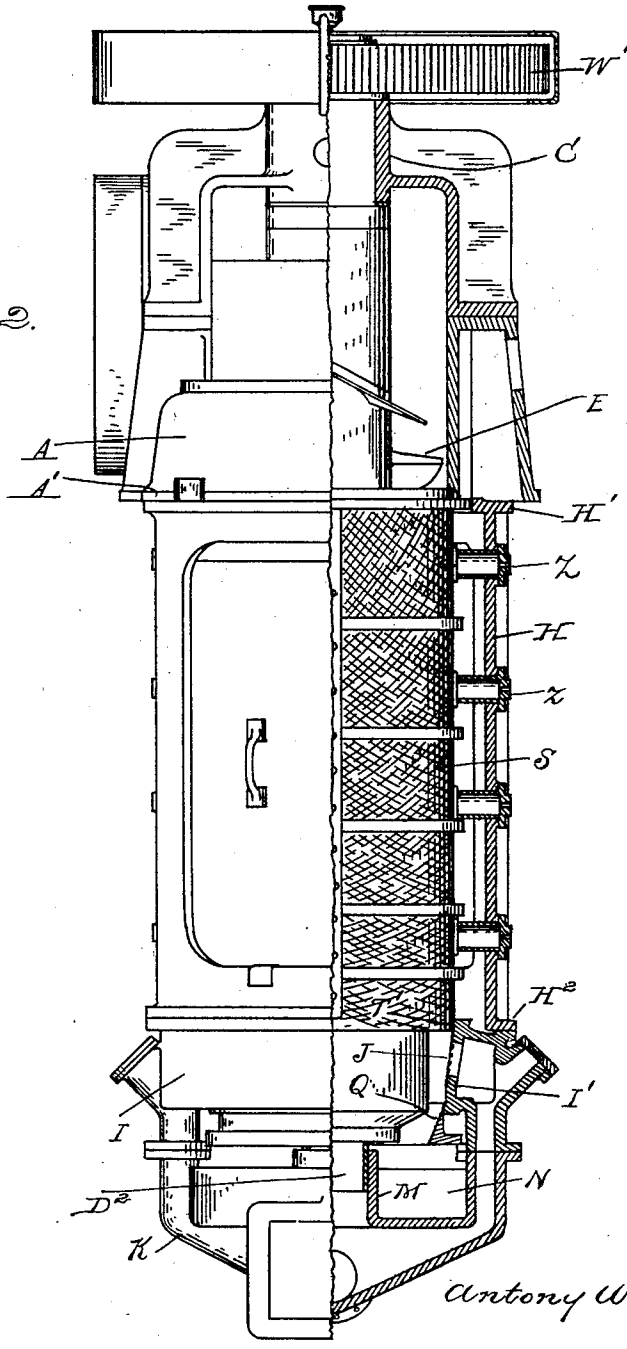
2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

ANTONY WERTENBRUCH, OF DETROIT, MICHIGAN, ASSIGNOR TO THE LARROWE MILLING COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF NEW YORK.

PULP-PRESS.

1,354,528. Specification of Letters Patent. Patented Oct. 5, 1920.

Application filed December 22, 1916, Serial No. 138,452. Renewed August 11, 1920. Serial No. 402,858.

To all whom it may concern:

Be it known that I, ANTONY WERTENBRUCH, a subject of the Emperor of Germany, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Pulp-Presses, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to pulp presses more particularly designed for use in the compression of beet sugar pulp, and the invention comprises various novel features of construction as hereinafter set forth.

In the drawings:

Figure 1 is a sectional elevation of the press;

Fig. 2 is a section looking at right angles to Fig. 1.

A is a frame which is mounted upon a suitable elevated support, such as the beams B B′, and which is provided with a journal bearing C for the vertically-arranged worm compressor D. The latter is in the form of a hollow shaft extending from its journal bearing through an opening in the frame between its supporting girders and having a conical portion D′ depending below the frame. E are the spiral blades or flights surrounding the conical portion D, being preferably semi-circular and arranged with their peripheral edges lying in the same cylindrical surface. Intermediate these blades the hollow body is formed with a series of apertures or slots F therein, which are covered with screen sections G wound spirally between the blades. H is a depending frame, having annular upper and lower heads H′ and H² arranged concentric to the worm D. The upper head is bolted or otherwise detachably secured to a machined bearing A′ on the frame A concentrically surrounding the aperture through which the compressor worm D extends. This bearing also holds the lower head H² concentric to the axis of the worm. I is a hollow ring member bolted or otherwise secured to the lower head H², being provided with a slotted tapering inner wall I′ which is covered by a screen J. K is a hollow yoke member connected to flanged nipples L depending from the hollow ring member I, and connecting said member with a laterally-extending liquid discharge conduit. The yoke is also provided with a central hollow bearing portion M, which engages a hollow journal portion D² at the lower end of the hollow worm D. It is further provided with a surrounding pan portion N having a discharge chute O depending from the bottom thereof, and scraper-blades P attached to the worm member D revolve in the pan and scrape the contents thereof to the discharge chute. Q is a ring of wedge-shaped cross section fitting within the ring member I and adapted to variably restrict the spaces between said member and the worm D. This restriction is effected by longitudinally adjusting the member Q into or out from the member I by means of the nuts R engaging threaded studs R′. S is a cylindrical screen surrounding the spiral blades E on the worm D and secured by the frame H, its upper end engaging an annular bearing T and its lower end seated in an annular bearing T′ in the ring I. U is a sheet-metal casing surrounding and spaced from the screen S.

With the construction as thus far described, the assembling of the parts or the disassembling of the same where repairs are needed, is facilitated. Thus the worm D may be inserted through the opening in the frame A and into engagement with its bearing C, and subsequently the frame H, ring I and yoke K may be placed in position; also the screen S may be inserted through the opening in the lower head H² of the frame H and is secured in position by the ring I. When assembled and in operation, the pulp which is forced downward by the spiral blades E during the rotation of the worm D will be squeezed between the inner and outer screens in a constantly diminishing annular space until it is finally forced outward through the opening into the ring I. As has been stated, this opening may be variably restricted by adjustment of the wedge-ring Q, so that any desired degree of compression may be imparted to the pulp. The ejected pulp falls into the pan N, from which it is forced by the rotating blades P into the discharge chute O. During this compression the water which is forced from the pulp through the screens will collect in the hollow ring I, from which it passes into the hollow yoke K, and will also collect inside of the hollow worm D

and will pass through the hollow journal D^2 into the yoke, from which it passes into the discharge conduit.

On account of the enormous friction as well as the high pressure upon the pulp considerable power is required for rotating the worm D. Where this power is transmitted through bevel-gears a great deal of vibration is produced, which is objectionable. I have therefore designed a construction of step-down transmission, dispensing with the use of bevel-gears and avoiding the rattling or vibration incident to their use. As shown, the frame A, in addition to the journal-bearing C for the worm, is provided with bearings V and V′ for a parallel shaft V^2. Upon this shaft is mounted a pinion W for engaging a spur-gear W′ on the worm D, being arranged adjacent to the bearing C, preferably immediately above the same. The shaft V^2 has also mounted thereon the worm-gear V^3, which is in mesh with the worm V^4 on the transverse shaft V^5, and this shaft derives its power from the motor X through a sprocket-and-chain transmission Y.

For tending to prevent the rotation of the pulp with the worm D, stationary abutments are secured to and project inward from the sides of the frame H into proximity to the screen S. These abutments Z are in the form of perforated tubes, and are utilized for the injection of a spray of steam into the pulp, by which it is lubricated and the frictional resistance diminished.

What I claim as my invention is:

1. A pulp press, comprising a supporting frame having an apertured bottom and a journal-bearing in axial alinement therewith, a worm-compressor extending through said apertured bottom into engagement with said journal-bearing, mechanism upon said frame for imparting rotary motion to said worm, a frame secured to and suspended from said first-mentioned frame, a journal-bearing for the lower end of the worm mounted upon said suspended frame, and a screen surrounding said worm insertible within said suspended frame into operative position when said lower journal-bearing is removed.

2. A pulp press, comprising a supporting frame having an apertured bottom and a journal-bearing in axial alinement therewith, a worm-compressor insertible through the aperture in said bottom into engagement with said journal-bearing, mechanism mounted on said frame for rotating said worm, a suspended frame provided with upper and lower annular heads and connecting side-bars, said suspended frame having a bearing on the main frame for its upper head, by which both heads are arranged in axial alinement with the worm, a cylindrical screen for surrounding the worm insertible through said suspended frame into operative position and positioned thereby, and a member detachably connected to the lower head of said suspended frame, providing a journal-bearing for the lower end of the worm and a collector for the separated pulp and liquid.

3. A pulp press, comprising a frame, driving mechanism mounted thereon, a worm-driven by said mechanism and depending from said frame, a frame suspended from the main frame, providing a removable journal-bearing for the lower end of said worm, and a screen surrounding said worm detachably engaging said suspended frame, said screen being movable downwardly upon removal of said journal-bearing.

4. In a pulp press, the combination with a frame, of a worm journaled in said frame and depending therefrom, a suspended frame secured to the main frame, a screen surrounding the worm detachably engaging said suspended frame, a journal-bearing for the lower end of the worm secured to said suspended frame, a pulp-receiving pan carried by said bearing having a discharge spout at one point, and scraper-blades suspended from said worm, engaging said pan.

5. A pulp press comprising a frame, a worm journaled in said frame and depending therefrom, a suspended frame provided with upper and lower annular heads, a cylindrical screen surrounding said worm, engaging bearings in said upper and lower heads, a hollow annular frame connected to said suspended frame and receiving the liquid excluded from the pulp, a hollow yoke connected to said hollow annular frame, receiving the liquid therefrom, a hollow journal-bearing on said yoke engaging a hollow journal on said worm, a pan for receiving the pulp surrounding said hollow journal-bearing, and a scraper-blade carried by said worm and located within said pan.

6. In a pulp press, a worm compressor comprising a hollow shaft having a conical portion, a series of semi-circular spiral blades or flights surrounding said conical portion arranged with their peripheral edges lying in the same cylindrical surface, said conical portion having a series of apertures or slots therein intermediate said blades or flights, a screen section wound spirally between said blades or flights and a screen surrounding and concentric with said hollow shaft.

7. A pulp press, comprising a supporting frame having a journal bearing, a worm compressor engaging said journal bearing, mechanism upon said frame for imparting rotary motion to said worm, a frame secured to and suspended from said first-mentioned frame, a journal bearing for the lower end of the worm mounted upon said suspended

frame, a screen surrounding said worm engageable with said suspended frame when the lower journal bearing is removed and abutments secured to and projecting inwardly from the sides of said suspended frame into proximity to said screen, said abutments adapted to lubricate the pulp adjacent to the screen.

8. A pulp press, comprising a supporting frame having a journal bearing, a worm compressor engaging said journal bearing, mechanism upon said frame for imparting rotary motion to said worm, a frame secured to and suspended from said first-mentioned frame, a journal bearing for the lower end of the wall mounted upon said suspended frame, a screen surrounding said worm engageable with said suspended frame when the lower journal bearing is removed, and perforated conduits adapted for the injection of a spray of steam into the pulp secured to and projecting inwardly from the sides of the suspended frame into proximity to said screen.

9. A pulp press, comprising a supporting frame, a worm compressor journaled in said frame, mechanism upon said frame for imparting rotary motion to said worm, a second frame upon said first mentioned frame, a screen surrounding said worm compressor engageable with said second frame and means adapted for the injection of a moisture spray into the pulp adjacent to said screen.

In testimony whereof I affix my signature.

ANTONY WERTENBRUCH.