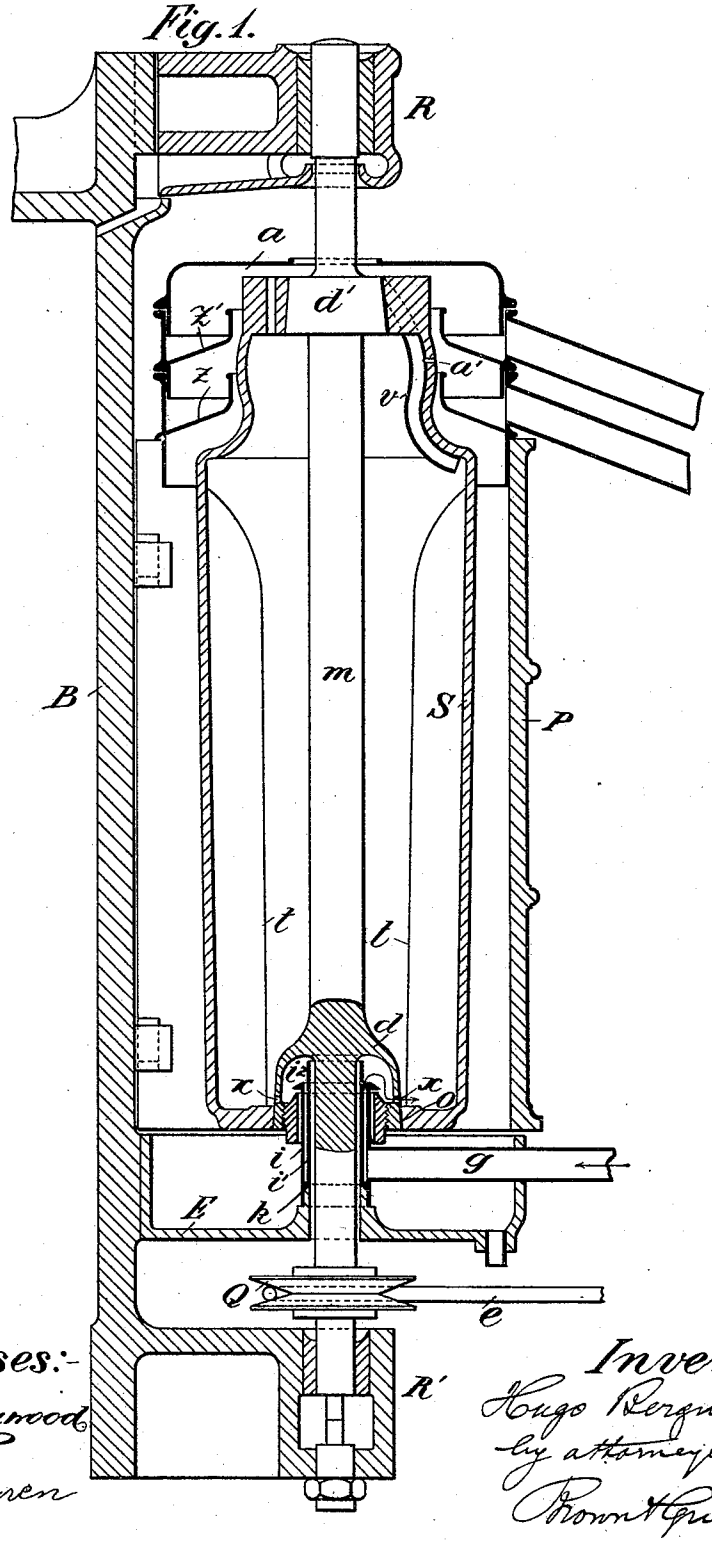
(No Model.) 2 Sheets—Sheet 1.

H. BERGNER.

CENTRIFUGAL SEPARATING MACHINE.

No. 416,320. Patented Dec. 3, 1889.

Fig. 1.



Witnesses:-
D. H. Haywood
C. L. Sundgren

Inventor:-
Hugo Bergner
by attorneys
Brown & Griswold

(No Model.) 2 Sheets—Sheet 2.

H. BERGNER.

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Fig. 2.

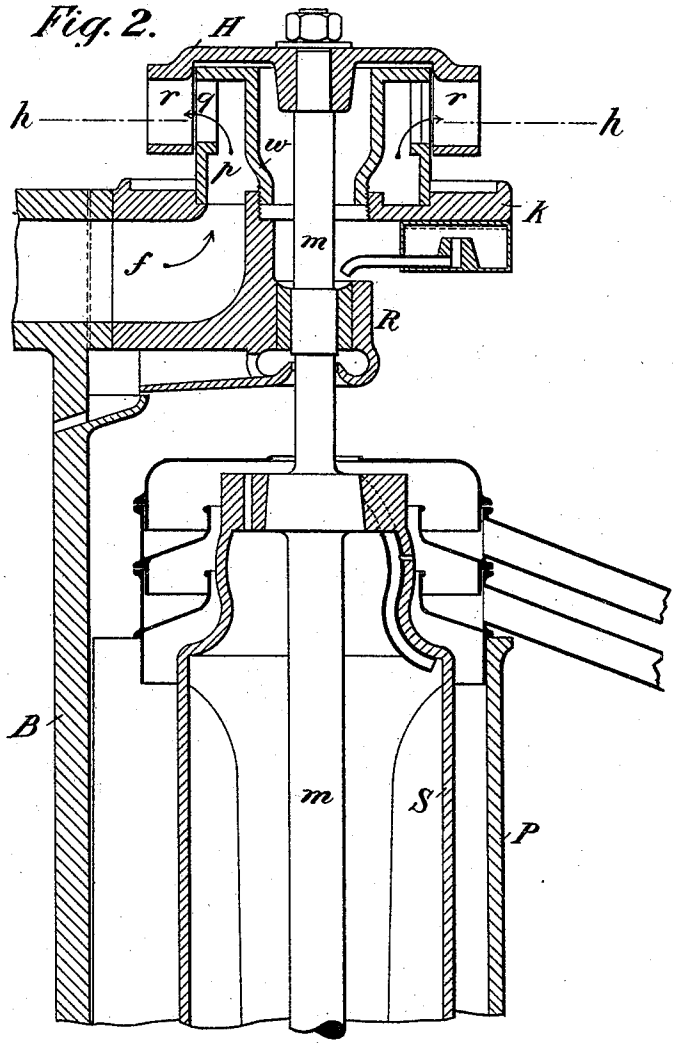
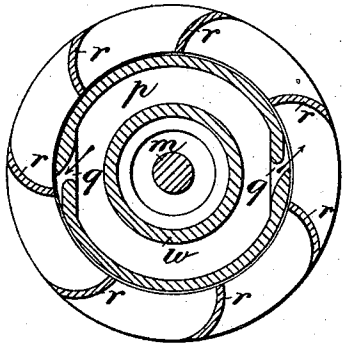


Fig. 3.



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UNITED STATES PATENT OFFICE.

HUGO BERGNER, OF BERGEDORF, GERMANY.

CENTRIFUGAL SEPARATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 416,320, dated December 3, 1889.

Application filed August 21, 1889. Serial No. 321,469. (No model.)

To all whom it may concern:

Be it known that I, HUGO BERGNER, of Bergedorf, in the Empire of Germany, have invented a new and useful Improvement in Centrifugal Separating-Machines, of which the following is a specification.

This invention relates to centrifugal machines in which mixed liquids are divided into their separate parts according to gravity and automatically removed from the machine by centrifugal force, and more especially to machines having a vertical cylindrical centrifugal vessel of such proportionately large height and small diameter that the liquid to be separated may be exposed to the action of centrifugal force for a considerable time in the said vessel during its passage through the same, said liquid entering below, while the separated products leave at the top.

The improvement is illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal vertical sectional view of the working parts of a centrifugal machine and part of the framing thereof. Fig. 2 is a similar view of the upper parts of a machine, illustrating a different method of driving the machine. Fig. 3 represents a horizontal section on the line *h h* of Fig. 2.

Similar letters of reference designate corresponding parts in all the figures.

I will first describe Fig. 1. S is the centrifugal vessel, provided with internal ribs *t* and secured at its top and bottom on conical bosses *d d'* on the vertical shaft *m*. P is an exterior casing, which is connected with the framing B, and R and R' are respectively upper and lower bearings for the shaft *m*. The lower bearing is a step-bearing. Q is the driving-pulley keyed on shaft *m* to receive motion through a band *e*.

In order to obtain a suitable inlet for the liquid to be separated, the shaft *m* is provided with a bell-shaped annular flange *d* at the place where the lower part of the centrifugal vessel S is secured to the said shaft. This bell *d* may be formed in one piece with the shaft and constitute one of the conical bosses on which the vessel S is secured, as shown in the drawings, or it may be fixed to the shaft as a separate piece. It is necessary that a free space i^2 remain between the shaft and bell. The connection between the centrifugal vessel and bell is at *o*, and may be contrived by shaping conically the outer wall of the bell and by placing the centrifugal vessel thereon from above, or the connection may be made by screw-thread or by any other suitable device. Around the lower continuation of shaft *m* are arranged the two concentric tubes *i* and *i'*, having a space between them through which the liquid reaches the bell *d* from an inlet-tube *g*, which connects with the reservoir containing the liquid. The tubes *i* and *i'* project into the bell *d*. These tubes are closed below by the ring *k*, so that the liquid can only flow out at the top in the direction of the arrow, and thus arrive in bell *d*. The wall of the bell *d* is provided within the centrifugal vessel with one or more perforations *x*, through which the liquid is drawn into the vessel by the centrifugal force, which is produced in the vessel S in the usual manner when rotary motion is given to the said vessel, causing the lighter portion of the liquid to leave the said vessel through the opening *a* in the top thereof and the heavier portion through the opening *a'* from the tube *v*, the separated portions passing, respectively, into the receiving-passages *z' z*.

The devices for the outflow of the liquids are well known, and consequently need no further explanation.

When the machine is at rest again, the liquid remaining in the centrifugal vessel flows out from the machine through the openings *x* into the open vessel E below.

In case the machine is to be driven by an air or gas current the shaft *m* of the vertical centrifugal vessel may be connected with a turbine, as shown in Figs. 2 and 3. In these figures, as in Fig. 1, *m* is the vertical shaft, which is supposed to be supported at the bottom in a step-bearing. S is the centrifugal vessel; B, a frame supporting the shaft-bearings and the cover H. At the upper end of the shaft *m*, above the bearing R, is secured a disk, the periphery of which, carrying the inclined or curved wings *r r*, projects over a cylindrical-shaped chamber *p*, from which the air blows through the openings *q* between the wings *r r*. The chamber-channel *p* is suitably formed by the metal piece *w*, which is con-

nected with the frame *k*, carrying the bearing R, and within the frame can likewise be arranged the air-feed channel *f*.

Air may be supplied to the feed *f* from a reservoir of compressed air or direct from an air-compressor, or liquid carbonic acid may be used for the impulsion by putting the channel *f* in connection with the reservoir containing the compressed liquid carbonic acid by a suitable pipe with valve for cutting off or regulating the supply of carbonic-acid gas thereto.

What I claim as my invention is—

In a centrifugal machine for liquids, having a vertical centrifugal vessel S and vertical shaft *m*, the bell *d* on the shaft, having perforations *x*, in combination with the concentric tubes *i i'* around the shaft for supplying the liquid within said bell, substantially as and for the purpose set forth.

HUGO BERGNER.

Witnesses:
F. ENGEL,
A. SCHAPER.