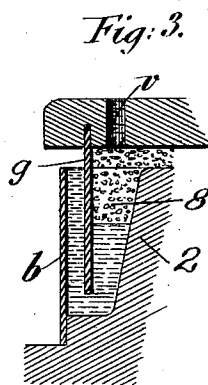
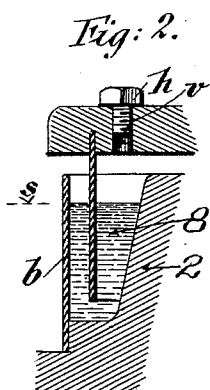
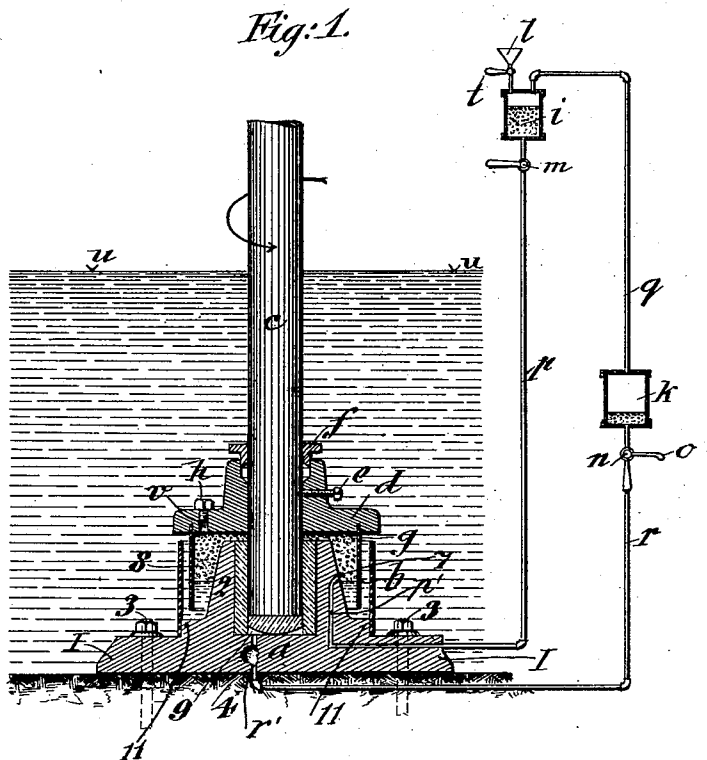


C. MITTAG.

LUBRICATING DEVICE FOR THE STEP BEARINGS OF SHAFTS.

(Application filed Aug. 14, 1902.)

(No Model.)



Witnesses
Henry J. Schurmer
C. F. Goepel.

Inventor
Carl Mittag
 By *his* Attorneys *James Viles*

UNITED STATES PATENT OFFICE.

CARL MITTAG, OF ALSEN, NEW YORK.

LUBRICATING DEVICE FOR THE STEP-BEARINGS OF SHAFTS.

SPECIFICATION forming part of Letters Patent No. 714,007, dated November 18, 1902.

Application filed August 14, 1902. Serial No. 119,611. (No model.)

To all whom it may concern:

Be it known that I, CARL MITTAG, a citizen of the Empire of Germany, residing in Alsen, in the county of Greene and State of New York, have invented certain new and useful Improvements in Lubricating Devices for the Step-Bearings of Shafts, of which the following is a specification.

The present invention relates to an improved lubricating device for the step-bearings of shafts which is designed to obviate the difficulties coincident with the lubrication of shaft-bearings placed in liquids; and the invention consists, essentially, in feeding the lubricating-oil stored in a closed oil-cup separate from and above the level of the liquid in which said step-bearing is located and transmitting the lubricant after use automatically to a closed reservoir separate from and below the level of the liquid in which the step-bearing is located.

The nature, scope, and characteristic features will be more fully understood from the following description, taken in connection with the accompanying drawings, of which—

Figure 1 is a vertical central section showing a step-bearing to which my improved lubricating device is applied; and Figs. 2 and 3 are detail vertical transverse sections of a portion of a step-bearing, showing the successive steps for charging the same with water and lubricating material.

Similar letters and numerals of reference indicate corresponding parts.

Referring to the drawings, *a* indicates a step-bearing which consists of a base that is attached to the bottom of a tank or reservoir 4 by bolts 3 3. Above and cast integral with the base of the step-bearing is a circular portion 2, having the shape of a conical frustum and which is provided at its lower part with a shoulder 11, to which is welded or otherwise attached a wrought-iron cylinder *b*. The circular portion 2 is made hollow, so as to form a cylindrical cavity for the lower end of a vertical shaft *c*. The lower end of the shaft *c* is supported on a Babbitt-metal bearing and inclosed by a shell of antifriction metal, which serves to hold the shaft in proper position. Above the step-bearing is attached to the vertical shaft *c* a collar *d* by a set-screw *e*, and to the under side of the collar *d* is at-

tached a wrought-iron cylinder *g*, which extends in downward direction into the annular space 8, formed between the circular portion 2 and the wrought-iron cylinder *b*, so as to divide said space 8 into two annular parts, which communicate with each other below the lower edge of the cylinder *g*. The upper part of the collar *d* is closed by a stuffing-box *f*.

The step-bearing described is to be used on the bottom of a mixing-tank or other vessel and submerged in water or other liquid.

i is a closed oil-cup which is placed above the level of the water in the tank and filled on opening cock *t* by means of a funnel 1 with a liquid lubricant—such as oil, for example. The oil-cup *i* is connected by a pipe *p*, having a stop-cock *m*, with a channel *p'* in the side wall of the step-bearing *a*. A second pipe *r* leads from a channel *r'* in the bottom of the step-bearing *a* to a second closed oil-cup *k*, located below the level of the water in the tank. Below this oil-cup is a three-way cock *n*, through which the lubricant is made to pass into the closed oil-cup *k*. The top part of the oil-cup *k* is connected by a pipe *q* with the top part of the first-mentioned oil-cup *i*.

The operation of my improved lubricating device may be described as follows: The tank or reservoir in which the step-bearing is placed and which is ordinarily filled with liquid—such as water, brine, &c., whose specific gravity is greater than of the oil—is supposed to be empty. The screw *h* of the inlet *v* is removed and some of the liquid poured through the same into the space 8 up to the level shown in Fig. 2. Lubricating-oil is then passed through the inlet *v* into the space between the shaft *c*, circular portion 2, and the intermediate cylinder *g*, so as to raise the level of the liquid by the weight of the lubricant in the outer leg of the space 8 nearly to the edge of the outer cylinder *b*, as shown in Fig. 3. The screw *h* is then replaced. After closing cock *m* and opening cock *t* the oil-cup *i* is filled with lubricating-oil by means of the funnel 1. Having filled the cup *i*, cock *t* is again closed. The liquid is then passed into the tank or reservoir in which the step-bearing is located up to the level *u u*. The step-bearing and its lubricating device is thus hydraulically sealed and an equilibrium of the pressure established in the pipes *r* and *q*, as

the reservoir *k* is empty and cock *n* open. The pressure of the liquid will act on the oil and force some of it around the journal of the shaft, separating said journal from its bearing by a thin film of oil, thus lubricating the journal and its bearing evenly and constantly, so as to insure the efficient running of the shaft. As the oil in the step-bearing is gradually used up it is necessary to supply an additional quantity of oil to the same. This is accomplished by opening the stop-cock *m* for a short period of time, whereupon a fresh supply of lubricant is passed through pipe *p* and channel *p'* to the interior part of space 8. As the pressure of said lubricant is somewhat greater than that of the liquid and as the pressure in the pipes *r* and *q* and the oil-cup *k* is somewhat diminished any surplus of the lubricant is forced from the lowest part of the step-bearing *a* in an upward direction through the pipe *r* into the oil-cup *k* until equilibrium is established. Upon again opening cock *m* a similar action will take place, the oil, due to its greater pressure, forcing itself into the inner part of the described communicating spaces and keeping thereby the journal of the shaft *c* and its bearing lubricated, while diminishing at the same time the pressure in the pipe *q*, permitting thereby the surplus oil and the spent oil to be forced into the reservoir *k* in direct proportion to the admitted oil and in inverse proportion to the pressure in the pipe *q* until cock *m* is again closed and a new equilibrium established between the pipe *q* and the reservoir *k*. Thus the supply of oil to the journal of the vertical shaft and its bearing will always be the same and may be replenished at any time by simply opening cock *m*, which is above the level of the liquid. As the oil in the oil-cup *i* is gradually used up by the intermittent opening of the cock *m* the oil-cup *k* will be gradually filled, and when it is desired to empty the oil-cup *k* the cock *t* is opened to permit the action of the pressure of the atmosphere. The three-way cock *n* is turned for a quarter of a turn, so that the spent oil may be drawn off into a vessel placed under a faucet *o* of said cock. In again filling the oil-cup *i* cock *n* is closed, and after said oil-cup *i* is again filled and cock *t* closed cock *n* is again opened, so that an equilibrium of pressure in the pipes *r* and *q* and the normal condition of the lubricating device is reestablished.

Having thus described my invention, I

claim as new and desire to secure by Letters Patent—

1. In a lubricating device for the step-bearings of shafts submerged in a liquid, the combination, with a step-bearing provided with a cylinder forming an annular space around said step-bearing, of a shaft supported in the same, a collar on said shaft provided with a cylinder extending into said annular space, an oil-cup located above the level of the liquid in which the step-bearing is placed, a second oil-cup located below the level of the liquid, pipes connecting said oil-cups with channels in the bottom and side wall of said step-bearing, stop-cocks in said pipes, and a pipe connecting the top parts of the oil-cups with each other, substantially as set forth.

2. In a lubricating device for the step-bearing of shafts submerged in a liquid, the combination, with the step-bearing provided with a cylinder forming an annular space around said step-bearing, of a shaft supported in the same, a collar on said shaft provided with a cylinder extending into said annular space, an oil-cup located above the level of the liquid in which the step-bearing is placed, a second oil-cup located below the level of the liquid, pipes connecting said oil-cups with channels in the bottom and side wall of the step-bearing, a stop-cock in the pipe below the higher oil-cup, a three-way cock and faucet in the pipe below the lower oil-cup and a connecting-pipe between the tops of the lower and higher oil-cups, substantially as set forth.

3. In a lubricating device for the step-bearing of shafts under water, the combination, with the step-bearing provided with a hollow cylinder forming an annular space around the same, of a shaft supported in said step-bearing, a collar on said shaft, said collar being provided with a hollow cylinder extending into the annular space between the step-bearing and its cylinder, an inlet-opening in said collar, and a screw-plug for closing the same so as to permit the charging of the annular space with the primary supply of water and lubricating-oil, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

CARL MITTAG.

Witnesses:

CL. PETERS,
HERM. BAASCH.