A. E. CLIFTON.

CONSTRUCTION OF ROTARY BLOWERS AND PUMPS.

APPLICATION FILED JAN. 19, 1911.

1,021,180. Patented Mar. 26, 1912.

Fig. 1.

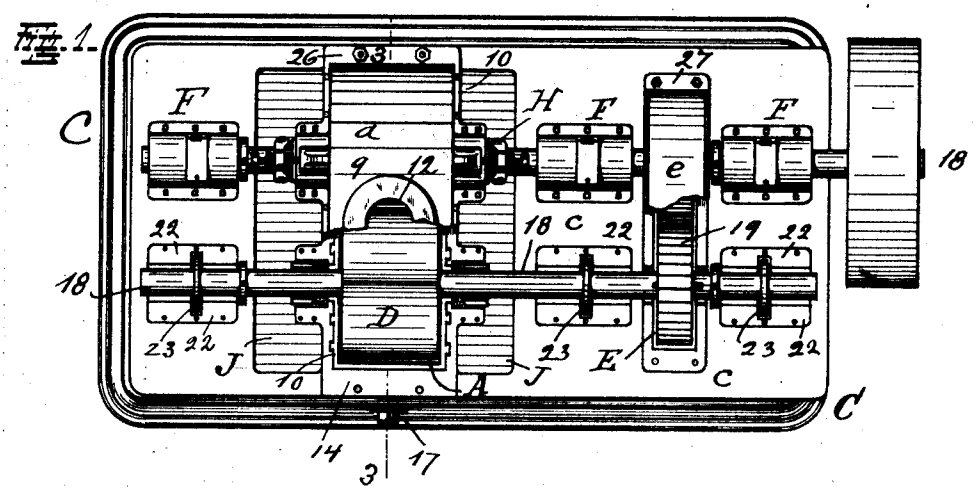


Fig. 2.

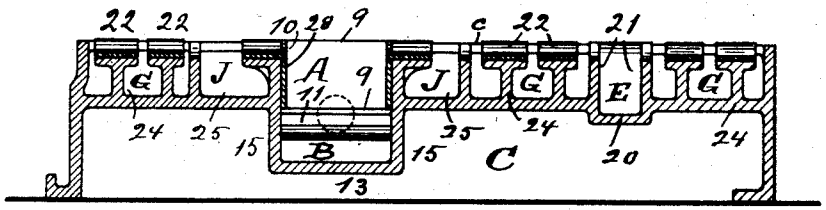


Fig. 3.

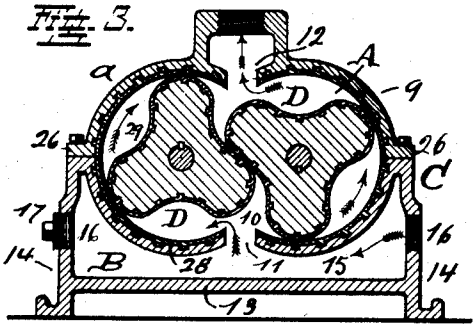


Fig. 4.

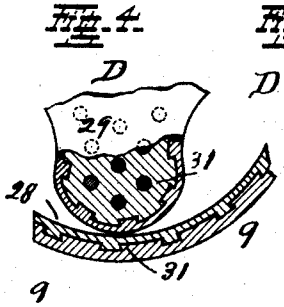


Fig. 5.

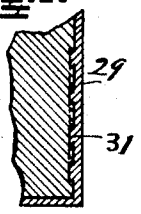


Fig. 6.

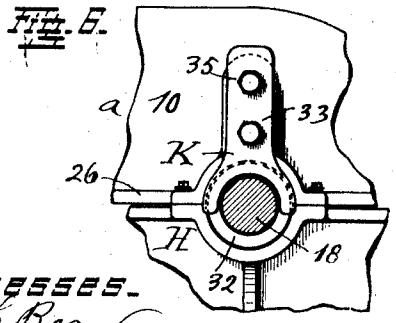
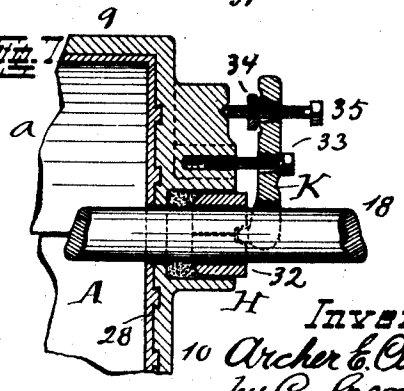


Fig. 7.



Witnesses.
T. LeBeau
M. Smith.

Inventor.
Archer E. Clifton
by C. Spengel atty

UNITED STATES PATENT OFFICE.

ARCHER E. CLIFTON, OF CONNERSVILLE, INDIANA.

CONSTRUCTION OF ROTARY BLOWERS AND PUMPS.

1,021,180. Specification of Letters Patent. Patented Mar. 26, 1912.

Application filed January 19, 1911. Serial No. 603,434.

To all whom it may concern:

Be it known that I, ARCHER E. CLIFTON, a citizen of the United States, and a resident of Connersville, Fayette county, State of Indiana, have invented certain new and useful Improvements in the Construction of Rotary Blowers and Pumps; and I do declare the following to be a clear, full, and exact description of the invention, attention being called to the drawing which accompanies this application and forms a part thereof.

This invention relates to improvements in the construction of a certain type of blowers or pumps and in which two rotary members, known as impellers, co-act by their complementary simultaneous actuation to move the matter, liquid, gas, air, etc., which is to be handled.

Much machine-tool work is required in the building of these pumps and the leading object of my invention is to construct them in a manner whereby this work is reduced and simplified so as to simplify the construction and to reduce the manufacturing cost accordingly.

Another object is to arrange the construction in a manner permitting ready access to the various parts without making it necessary to dismantle the entire pump.

In the following specification and particularly pointed out in the claim at the end thereof, will be found a full description of my invention, together with its parts and construction, which latter is also illustrated in the accompanying drawing, in which:—

Figure 1, shows a top-view of such a pump, parts being removed and others broken away, showing substantially a top-view of the bed-frame of the device. Fig. 2, is a vertical longitudinal section of this bed-frame. Fig. 3, is a cross-section of the complete device on line 3—3 of Fig. 1. Fig. 4, shows portions of Fig. 3, at enlarged scale. Fig. 5, shows parts of Fig. 4, in a section at right angles to said figure. Fig. 6, shows parts of Fig. 3, as they appear when viewed externally and at enlarged scale, it being substantially a front-view of the stuffing-box used. Fig. 7, shows these parts in a central longitudinal section and as they appear when viewed in a plane at right angles to Fig. 6.

In the drawing, A indicates the working chamber of the pump, formed and inclosed by the annular side 9 and the parallel sides 10, 10. Openings 11 and 12 are provided in annular wall 9, one serving as an inlet and the other for an outlet. In connection with opening 12, there is a boss or nipple to permit pipe-connection. When liquid is handled, the lower opening may be used as an inlet, in which case a receiving chamber B is provided below it, of which 13 is the bottom. Two of the sides of this chamber are formed by parts 14, 14 of the sides of bed-frame C.

15, 15, indicate the other two sides, they being below the parallel sides of the working chamber.

Two inlet-openings 16, 16, with pipe attaching nipples are provided to permit attachment of a supply-pipe on either side, the non-used opening being closed by a plug 17. Provision, similarly arranged, may also be made for intake through the bottom.

The substance handled is moved by two impellers D fitted to operate within chamber A and in conjunction with the sides thereof and with each other. They are mounted on shafts 18 and rotate in opposite directions so as to co-act with each other and with the chamber-wall in a manner to draw matter in through the inlet and moving it toward the outlet where it is expelled. One of these shafts is driven by a pulley and rotates the other shaft by means of intermeshing gear-wheels 19, one mounted on each shaft. They are inclosed in a chamber E of which 20 is the annular side and 21 are the opposite, parallel sides.

When liquid is moved, part of it remains in chamber B, causing a partial submergence of the impellers, so that the pump is always primed for action to respond immediately when started.

The shafts are supported in boxes F, there being three to each shaft, one at or near each end of each and one between the impellers and the gear-wheels. The lower part of each box consists of two divided parts 22 to admit an oiling ring 23 which hangs on the shaft and depends into an oil chamber G, formed below each box, 24 being the sides of these chambers. A cap 15 is provided for the two parts of each box.

Stuffing boxes H are provided where the shafts pass through sides 10 of chambers A and recesses J are formed below them in the bed-frame and of which 25 are the sides. In most of these pumps as heretofore con-

structed, chamber A was divided at, and in line with the parallel sides 10, which sides were in form of detachable heads. They could not be removed however if access was desired to the interior of chamber A for instance, unless the shafts were first removed, which required opening of boxes F, and amounted practically to a complete dismantling of the entire pump. To obviate this, I divide all non-movable parts of the pump on a plane passing through the axis of each of the two shafts, so that all parts located on one side of this plane may be removed without requiring disturbance of the shafts, the removable parts being detachably connected to their complementary parts which remain in position by suitable means like screws and bolts. Accordingly the sides of chamber A are divided on a line corresponding to this plane of division and whereby a removable upper half *a* results containing one half of annular side 9 and one half of each of the parallel sides 10. A flange 26 is provided on this removable half which permits attachment of it to its complementary half.

Gear-chamber E is divided in a similar manner which results in a removable upper half *e* which is provided with flanges 27, permitting attachment to the lower half. The halves of chamber A and chamber E below the shafts, form integral parts of bed-frame C, as do sides 24 of oil-chambers G, the sides 25 of recesses J and the lower half of all shaft boxes. As a result the lower ones of the two superposed opposite surfaces of a joint are all in one plane, which plane is substantially the upper surface *c* of bed-frame C. The effect of this construction is of far-reaching advantage inasmuch as it permits the planing of all of these surfaces at one time and in one operation so that absolute true alinement is assured.

The extent of surfaces to be planed may be reduced by having those portions of surface *c* upon which the attaching flanges of parts *a* and *e*, as well as those of the caps of the boxes are seated, slightly higher than the remaining parts of surface *c*.

Machine-tool work on the interior surfaces of the walls of chamber A and on the opposite surface of impellers D is made unnecessary by providing a lining, respectively coating for these surfaces, of a metal which casts with little shrinkage and leaves a smooth-surface. White metal or a similar metal or alloy which by preference is also non-corrosive, is suitable for this purpose. It may be mentioned here that the softness of such a metal is not objectionable for use in this connection inasmuch as no actual rubbing contact takes place between the operating parts of these pumps. 28 indicates the lining of chamber A and 29 indicates the coating of the impellers, the added metal being held in place in each case by an interlocking joint, formed as plainly indicated in the drawing, Figs. 4 and 5.

The procedure in case of forming lining 28 is as follows: When bed-frame C is cast, a core is used which produces the desired shape and dimensions for the cast-iron portion and also forms recesses 31 or complementary projections. After that a core of reduced size is used within this casting, leaving a space to receive the metal for the lining. This metal enters recesses 31 and becomes securely connected. The procedure, in case of upper part *a* is the same.

Each core has prints, or extensions equivalent to the shafts, so as to permit true centering and perfect alinement. These prints may extend into all the boxes, so that the Babbitt metal forming the shaft-bearings may also be poured at the time.

The procedure for coating the impellers is analogous, except that two molds are used.

The interior of the gear-chamber requires no coating.

The stuffing boxes must be constructed in accordance with the general plan and requires a divisible gland, which is accordingly formed in two halves as shown at 32.

A yoke K is provided which straddles the shaft and engages with its bifurcated parts the two gland sections. It is loosely held in position by a screw 33 and in a manner permitting it to adjust itself to the gland. A nut 34 carried on a screw 35 is used to adjust the yoke to cause the gland to follow up the packing.

As will be seen the fact that the joint-forming surfaces are alined in one plane facilitates not only the construction, but permits quick work in erecting and insures correct positions.

Correctly shaped molds, cores and formers being once provided, the peculiar shape of the impeller is obtained quickly and with reliable accuracy without requiring slow and tedious machine-tool work.

The fact that the opposite surfaces of the working parts are formed of non-corrosive metal prevents these parts from sticking, due to rust formed during non-use.

Access for cleaning and inspection may be quickly had without dismantling the pump.

The working surfaces, if defective from wear or otherwise, may be quickly and inexpensively renewed by melting out the metal and by re-casting new linings and coatings.

Having described my invention, I claim as new:

In the construction of rotary pumps, the combination of parallel shafts, interacting impellers and intermeshing gears mounted on them for simultaneous rotation, an in-

closure for the impellers, an inclosure for the gears, bearings for the shafts one for each of them located between impellers and gears and one at each end of each shaft, so that each shaft is supported on each side of the gears, oil-chambers provided one below each bearing, and a bed-frame containing integrally formed in it the lower half of the inclosure for the impellers and of the inclosure for the gear-chamber, also the lower half of all the shaft-bearings and the oil-chambers connected therewith whereby perfect parallelism of the shafts and alinement of their bearings is obtained by a rigid, one-piece supporting structure.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

ARCHER E. CLIFTON.

Witnesses:
L. L. BROODDUS,
E. E. MOORE.