B. INHÜLSEN.

ROTARY PUMP.

APPLICATION FILED MAR. 25, 1912.

1,046,791. Patented Dec. 10, 1912.

Fig. 1.

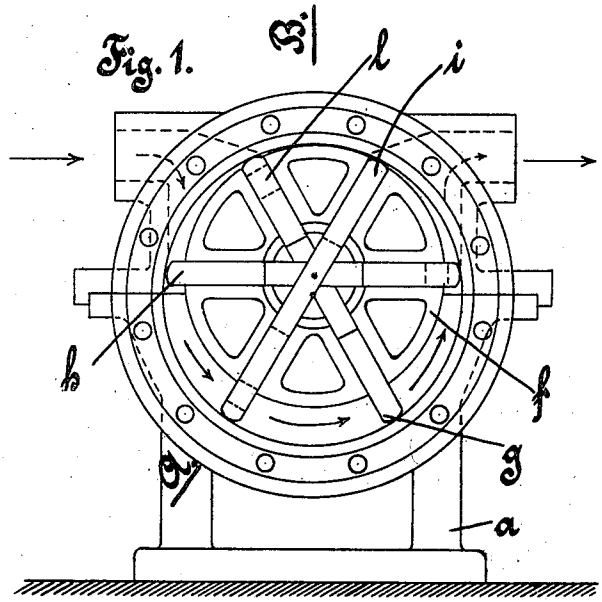

Fig. 2.

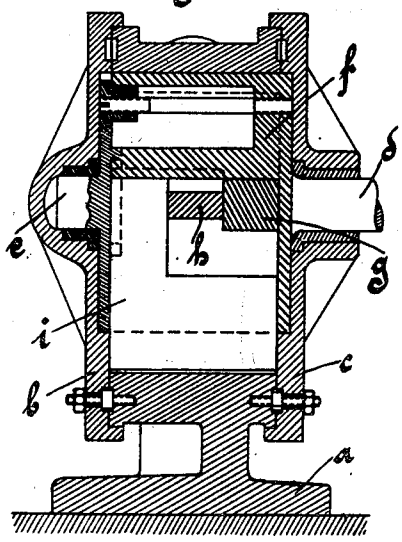

Fig. 3.

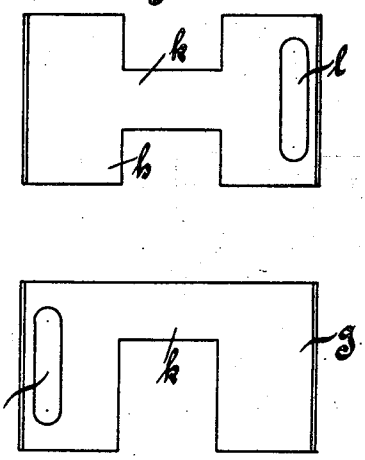

Fig. 4.

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UNITED STATES PATENT OFFICE.

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ROTARY PUMP.

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To all whom it may concern:

Be it known that I, BERNHARD INHÜLSEN, a subject of the German Emperor, and a resident of Rüstringen, Germany, have invented a new and useful Improvement in Rotary Pumps, of which the following is a specification.

This invention relates to improvements in rotary pumps of the kind in which a slidable blade or piston is carried by a rotary driving part eccentrically supported in the pump casing.

The object of the present invention is to enable the blades or pistons to be multiplied without necessitating the use of an excessively wide pump or elaborate construction of the casing.

According to the present invention the blades or pistons cross one another at or about the axis of the pump and the blades are provided with suitable openings to allow this mutual crossing while not in any way interfering with their free sliding movement.

It will be understood that this construction not only enables the breadth of the machine to be reduced, but it allows the blades to retain their straight line form and facilitates packing, while at the same time the simple sliding bearing or guiding of the blades in the rotating driving part is retained. In consequence of this the up-keep and repair of a pump of this kind is simple, easy and cheap.

By a proper arrangement of the side openings in the blades the number of these may be considerably increased, for instance, three or even four blades may be used, whereby the stress on each blade is reduced and also the packing difficulties so frequent in pumps of this type are to a considerable extent relieved. It will be understood that by reducing the pressure on each individual blade the packing of such blades becomes an easier problem.

The invention will be more readily understood from the following description of one particular form illustrated by way of example in the accompanying drawings, in which—

Figure 1 is a side view of a pump according to this invention with the side cover removed to show the blades. Fig. 2 is a cross section on the line A—B of Fig. 1. Fig. 3 is a separate view of the center blade seen in Fig. 2. Fig. 4 is a view of one of the side blades seen in Fig. 2.

In carrying the invention into effect according to the form shown, the casing or frame *a* is of the simplest and most compact shape, and is closed on either side by covers *b* and *c*, respectively. In the covers *b* and *c*, there are provided bearings for the shafts *d* and *e*. On the shafts *d* and *e*, there is supported the driving member *f*, which may be composed of any suitable number of parts in accordance with the particular requirements of the pump. The driving part *f* is provided with a number of diametrical passages in which the blades *g*, *h* and *i* are accommodated. Only three such blades are shown in the case illustrated. The blades *g*, *h* and *i* are adapted to slide in the guiding slots on the driving member *f*. Each blade really forms two active blades which are connected by a center piece of reduced size, and this center piece is arranged more or less in the middle, or to one side, according to the number and disposition of the blades. Thus the blade *h* has its central part *k*, located in the middle, while the blades *g* and *i* have the central binding part *k*, located at one side. The total width of the pump, therefore, corresponds to the active width of the blades *g*, *h* and *i*. It will be understood that the central joining pieces *k* are reduced in width to suit the number of blades to be used. This simple arrangement permits of the blades being guided in an opening passing through the axis of the driving part and this is a feature which adds greatly to the simplicity and cheapness in the construction of the machine. The length of the side openings in each blade corresponds to the amount of sliding motion required of the blade. Thus the length of the side openings should be such as to permit of this sliding movement of the blade and allow the other bars *k* to pass easily therethrough. As is known the amount of the sliding movement of each blade corresponds approximately to the eccentricity of the casing and the driving member.

The fluid to be pumped passes through the pump in the direction of the arrow. The arrows outside Fig. 1 represent the direction to the inlet and from the outlet of the pump. At each revolution the sector shaped space confined between each adjacent pair of blades increases during the first half and

decreases in the second half, until the outlet opening is reached, which in the case shown is assumed to be at the top in Fig. 1. The fluid, for instance water, inclosed in one of the sector shaped spaces would thus be under vacuum during the first half of the revolution, if it were not that the next succeeding blade is provided with a port opening *l*. The sector shaped space therefore by increasing causes the suction of water through the opening *l*, of the next following blade and the compression in the second half revolution causes the water or the like to be delivered to the outlet under pressure corresponding to the different diameters of the casing *a* to be fitted tightly with the blades *g*, *h* and *i;* these blades must have each a resilient shoe *m* sliding on the inside of the casing.

Having fully described my invention, what I claim and desire to secure by Letters Patent, is:—

1. In a rotary pump, a casing, a driving member in the casing formed with diametrical passages, and a series of blades sliding in said passages, each blade having one of its ends formed with an opening and having means at its opposite end to form a close contact with the casing interior, said openings and means of the several blades being alternately arranged.

2. In a rotary pump, a casing having an eccentric interior, a driving member therein, and a series of spaced slidable blades carried by the driving member, each alternate blade being formed with an opening to prevent the formation of vacuum in the space between two of the blades during part of the revolution of the latter.

BERNHARD INHÜLSEN.

Signed in the presence of—
WILHELM STRUP,
FREDERICK HOYERMANN.