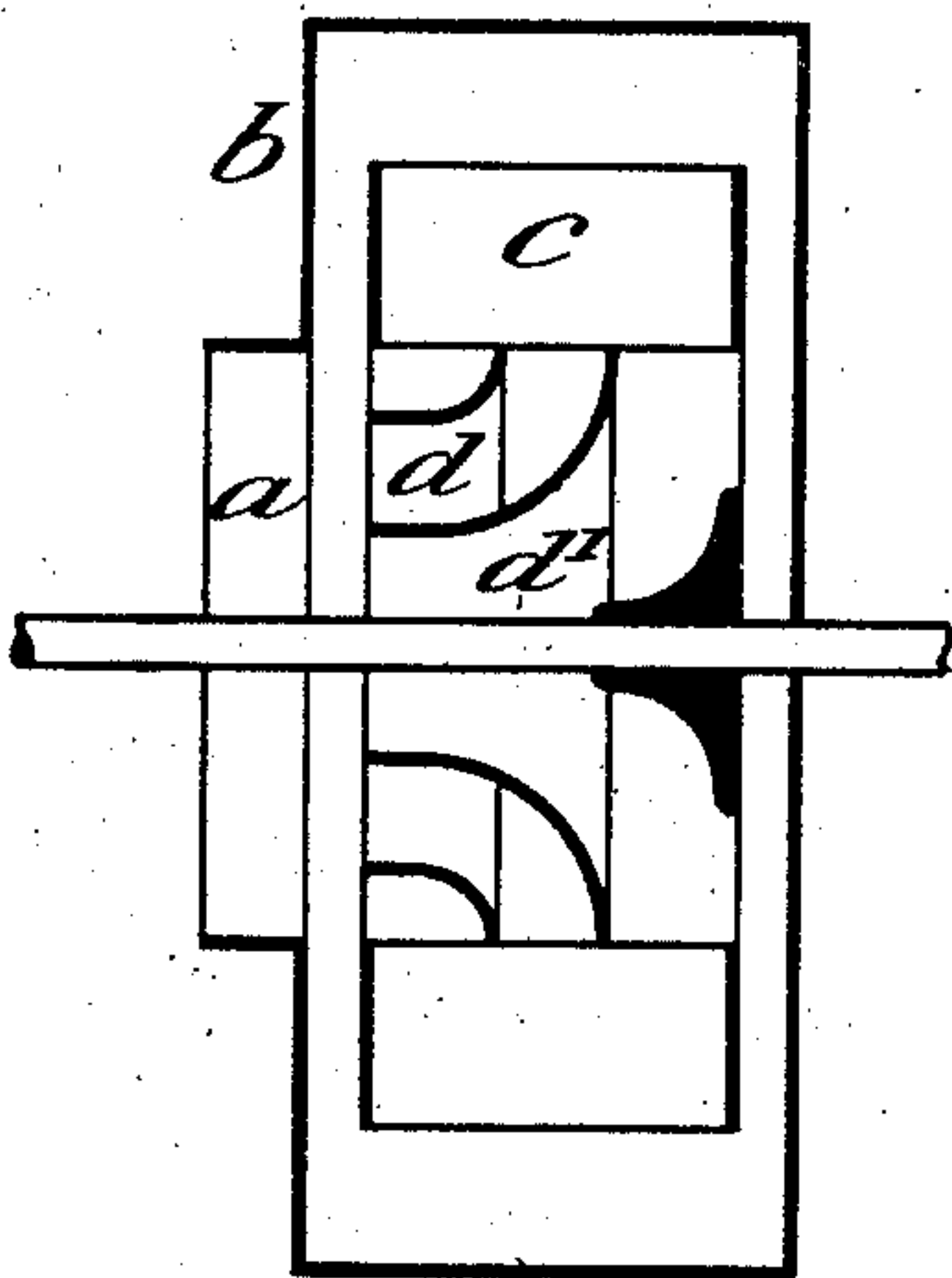


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CENTRIFUGAL PUMP OR FAN.  
APPLICATION FILED OCT. 23, 1905.

905,712.

Patented Dec. 1, 1908.



Witnesses:

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*By*

*James L. Norris.*

*Att'y*

# UNITED STATES PATENT OFFICE.

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## CENTRIFUGAL PUMP OR FAN.

No. 905,712.

Specification of Letters Patent.

Patented Dec. 1, 1908.

Application filed October 23, 1905. Serial No. 284,062.

*To all whom it may concern:*

Be it known that I, OTTO KRELL, a subject of the King of Bavaria, residing at 22 Kurfürstendamm, Charlottenburg, near Berlin, Germany, engineer, have invented a certain new and useful Improved Centrifugal Pump or Fan, of which the following is a specification.

This invention relates to that construction of centrifugal pumps or fans in which the fluid enters a central chamber from the suction inlet and passes thence to a revolving ring of propelling blades surrounding the said chamber.

The examination of the action taking place in the suction space or chamber of this class of centrifugal pump or fan shows that the work to be done is unequally distributed over the pump blades, as the total quantity of fluid drawn in is not uniformly distributed over the blades, the greatest amount of work being performed by that part thereof which is farthest away from the suction pipe, so that the fluid attains the greatest speed in the spaces between the blades at that part. In the direction towards the suction pipe the speed gradually decreases, and in some cases it sinks to and even below zero, that is to say, at those parts there may occur a backward flow of the liquid already situated in the pump channels and the pressure space. This unequal loading of the pump blades results in considerable disadvantages. Irrespective of the fact that only a part of the blade surface is usefully employed, eddies occur in the liquid to the detriment of the useful effect of the pump.

In addition, very unequal currents occur in the pump casing, and in the pressure channel, or, in the case of exhaust pumps or fans, in the discharge, which also gives rise to the formation of eddies and other disturbing movements of the fluid, and further reduces the useful effect of the pump. These phenomena occur equally in hydraulic pumps and in fans, and in particular in those with wide pump blades and large suction space centrally within the blade ring.

According to the present invention these disadvantages, namely the unequal loading of the pump blades, and the formation of eddies, are obviated, by guiding the fluid, whether a liquid or a gas, in such a definite manner in the suction space that the fluid particles are made to pass, without back

flow and with a very uniform change of direction, from the axial direction in which they enter the suction space, into the radial direction in which they enter between the pump blades. This guiding of the fluid particles in the suction space is effected according to the present invention by causing them to flow through tubes situated between the suction pipe and the blade ring.

The guide tubes are most simply formed by funnel or trumpet-mouth shaped structures, as shown on the accompanying drawing, which shows a cross section of a rotary pump or fan, and where *a* is the suction inlet to the casing *b c* are the rotary pump blades and *d d'* the concentric guide tubes. It is true that this arrangement does not entirely prevent a certain amount of inequality in the loading of the different parts of the blades, but by a suitable choice of the number of the guide tubes such inequality can be reduced to an exceedingly small amount. The guide tubes can either be attached to and rotate with the blade ring, or they may be stationary, in which latter case the guide tubes are advantageously arranged somewhat eccentrically.

It will be seen that with this construction the axially entering fluid is, as it were, divided into concentric zones, the parts thereof farther away from the pump axis being deflected into the radial directions sooner than the parts nearer the axis.

Having thus described the nature of my said invention and the best means I know of carrying the same into practical effect, I claim:—

In a centrifugal pump or fan, a revoluble ring of propelling blades surrounding a central space having a lateral suction inlet, and a plurality of trumpet mouthed guide surfaces contained within the said central space, arranged one within the other with their axes substantially co-axial with the ring of blades, said guide surfaces commencing at the suction inlet and terminating at the inner periphery of the said ring of blades, substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

OTTO KRELL.

Witnesses:

HENRY HASPER,  
WOLDEMAR HAUPT.